

THE MEXICAN SPECIES OF *ECTOPSOCUS* (PSOCOPTERA: ECTOPSOCIDAE) AND AN ANALYSIS OF THE DISTRIBUTION OF THE GENUS

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RESUMEN

Se registran en este trabajo a 19 especies mexicanas de *Ectopsocus*, 11 de las cuales se describen. Los tipos de las nuevas especies se encuentran depositados en la Colección de Insectos del Instituto de Biología de la UNAM. Siete de las especies mexicanas de *Ectopsocus* son de distribución cosmopolita o pantropical, una especie se conoce también del sur de Florida y del Caribe, y sólo 11 especies han sido registradas en México, para dar un nivel de endemismo de 57%. Las especies mexicanas de *Ectopsocus* constituyen un 73% del total de *Ectopsocus* neotropicales. Se reconocen, hasta ahora, a 130 especies en el género, que tiene la mejor representación en la región oriental con 45 especies, seguida por la región neotropical con 26 especies y por la región australiana, con 24 especies. El mayor endemismo se observa en la región australiana, con 75% de especies endémicas, seguida por la región neotropical, con 69% de endemismo y por la región oriental, con 60% de endemismo. Oceanía, Madagascar y África Continental presentan niveles moderados de endemismo. Así, es posible reconocer tres centros principales de diversificación y evolución de *Ectopsocus*: la región Oriental-Oceánica, la región Australiana, y la región Neotropical.

Palabras clave: Psocoptera, *Ectopsocus*, sistemática, zoogeografía.

ABSTRACT

Nineteen species of *Ectopsocus* are recorded from Mexico, and 11 of them are here described. The types of the new species are deposited in the Insect Collection, Instituto de Biología, UNAM, Departamento de Zoología. Seven of the Mexican species are either cosmopolitan or pantropical, one is also known from southern Florida and the Caribbean area, and 11 are only known from Mexico, for a level of endemism of 57%. The Mexican *Ectopsocus* represent a 73% of the *Ectopsocus* known in the Neotropical region. This genus presently includes 130 species, and is best represented in the Oriental region, with 45 species, followed by the Neotropics, with 26 species, and the Australian region, with 24 species. Endemism is highest in the Australian region (75% endemics), followed by the Neotropics, with 69% endemics, and the Oriental region, with 60% endemics. Oceania as a whole, Madagascar, and Continental Africa, present moderate levels of endemism for *Ectopsocus* species. Thus, three main centers of diversification and evolution of *Ectopsocus* are recognized: the Oriental Oceanic, the Australian, and the Neotropical.

Key words: Psocoptera, *Ectopsocus*, systematics, zoogeography.

The genus *Ectopsocus* (Ectopsocidae: Homilopsocidea), was erected in 1899 by McLachlan, the type species being *E. briggsi*, now known to be a cosmopolitan

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species. *Chaetopsocus* Pearman, *Micropsocus* Enderlein and *Interpsocus* Edwards, are names that have fallen in synonymy with *Ectopsocus* (New, 1973; Smithers, 1967; Thornton & Wong, 1968). The genus is well represented in all regions of the world, particularly in the Oriental and Pacific regions; previous to this work only three species had been recorded in Mexico, but collecting in this country since the early 1970's revealed the presence of many more species. The purpose of this paper, therefore, is to review the Mexican *Ectopsocus* as now known, and to present comments on the world distribution of the genus.

Unless otherwise indicated, the specimens studied were collected by the author, other collectors can be identified in the text by the following abbreviations: BGG, Benjamín García G.; HB, Harry Brailovsky; CWOB, Charles W. O'Brien; DY, Daniel Yáñez; GEE, Gary E. Eertmoed; IWB, Ian W.B. Thornton; LC, Ligia Collado and LML, Leticia Menchaca López. The specimens for microscopic study were dissected and mounted permanently either in Euparal or in Hoyer's Medium. Measurements were taken on specimens mounted on slides, using a filar micrometer whose measuring unit was 136 microns for wings and 53 microns for other parts. The type specimens are deposited in the Insect Collection, Instituto de Biología, UNAM.

SPECIES LIST

Ectopsocus briggsi McLachlan

E. briggsi McLachlan, 1899, p. 277, distribution and synonymy in Smithers, 1967.

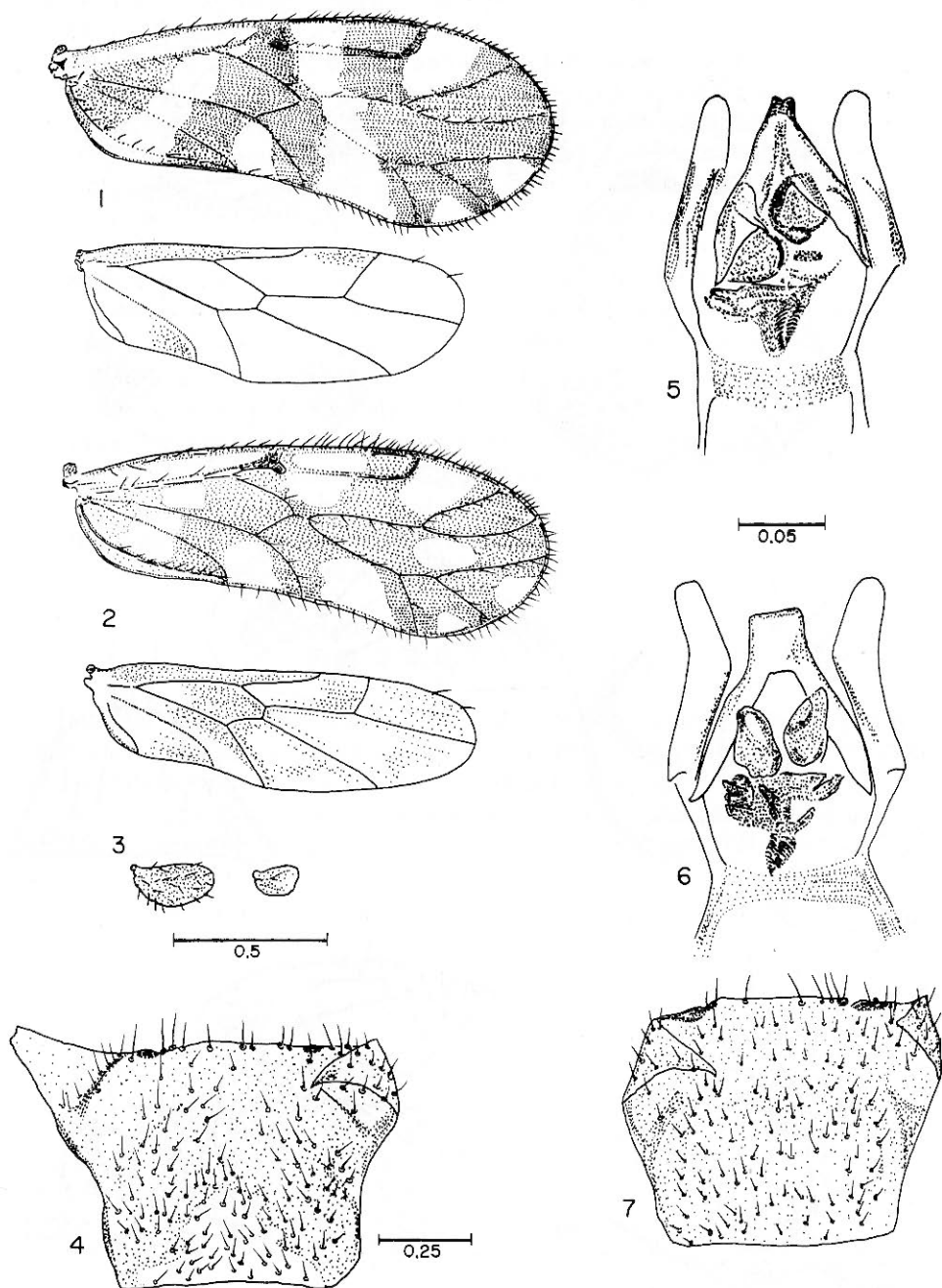
This is the type species of the genus. It is cosmopolitan in distribution (Table 2), and belongs in species group *briggsi* of Thornton & Wong (1968). In Mexico it has been collected in the Distrito Federal, and in the states of Hidalgo, Mexico, Morelos, Nayarit, Nuevo León, Oaxaca, Puebla, Tamaulipas and Veracruz. The individual records are too numerous to be cited.

Ectopsocus chiapensis n. sp.

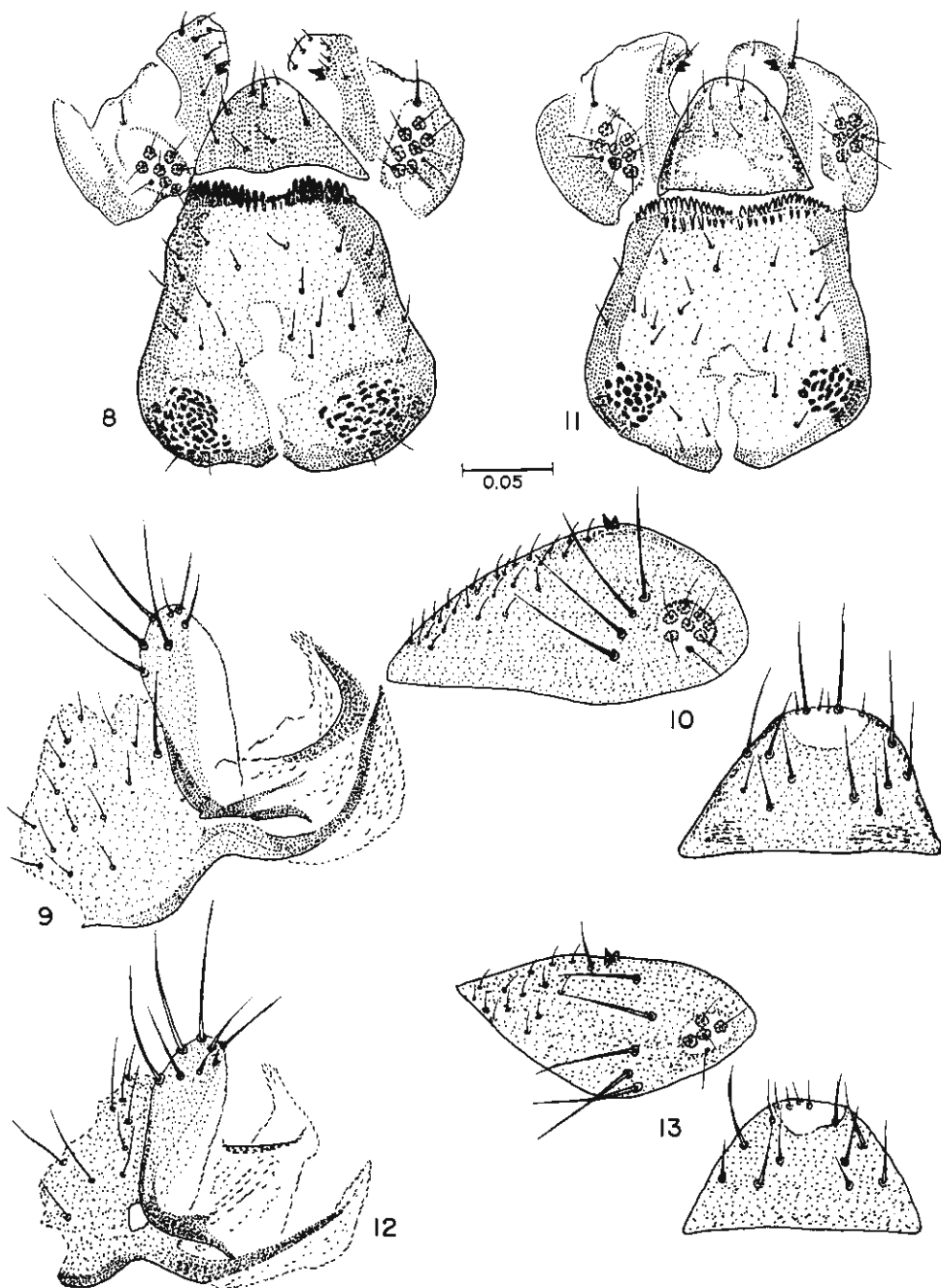
(Figs. 1, 4, 5, 8, 9, 10 and 14)

Female. Color (in 80% alcohol). Body dark brown, with well defined black sulci. Compound eyes black, ocelli clear, with centripetal crescents chocolate brown. Antennae brown, legs dark brown, with trochanters pale brown. Pattern of coloration of fore wings as in figure 1. Abdomen with brown subcuticular rings.

Morphology. Macropterous. Subgenital plate (Fig. 14) with pigmented area clearly cleft anteriorly so it becomes divided in two halves; posterior projections apically blunt, each with three macrosetae along the apex and one on the external margin. A transverse row of 18-19 macrosetae towards the base of the posterior projections. Gonapophyses (Fig. 9) complete, typical of the genus; dorsal valves each with a boomerang-shaped pigmented area. Paraprocts (Fig. 10) each with a transverse row of four macrosetae, sensory fields with 8-9 trichobothria (one without basal rosette), marginal cones bifid, asymmetrical. Epiproct trapezoid (fig.



Figs. 1-7. *Ectopsocus* spp.: *E. chiapensis* n. sp. 1. Fore and hind wings, ♂ ; 4. Hypandrium, ♂ ; 5. Phallosome, ♂ . *E. chiapensoides* n. sp. 2. Fore and hind wings, ♂ ; 3. Fore and hind wings, ♀ ; 6. Phallosome, ♂ ; 7. Hypandrium, ♂ ; Scales in mm. Figs. 1 and 2 to same scale as Fig. 3. Fig. 6 to same scale as Fig. 5. Fig. 7 to same scale as Fig. 4.



Figs. 8-13. *Ectopsocus* spp.: *E. chiapensis* n. sp. 8. Clunium, epiproct and paraprocts, ♂; 9. Gonapophyses, ♀; 10. Epiproct and right paraprocts, ♀. *E. chiapensoides* n. sp. 11. Clunium, epiproct and paraprocts, ♂; 12. Gonapophyses, ♀; 13. Epiproct and right paraproct, ♀. Scale in mm. All figures to the same scale.

10), with an unpigmented apical area, setae as in figure 10.

Measurements (in microns) (Table 1)

Male. Color (in 80% alcohol). Same as the female.

Morphology. Macropterous. Hypandrium (Fig. 4), setose with a triangular unpigmented area anteriorly. Phallosome (Fig. 5), with external parameres slender anteriorly, and connected anteriorly by a membranous bridge; each paramere almost straight posteriorly, stout and apically blunt. Internal parameres fused to form a triangular structure, open anteriorly; radular sclerites rounded, and an irregular sclerotized area anteriorly. Ninth tergite with anterior and lateral margins strongly sclerotized (Fig. 8), with a strongly sclerotized apical comb and a field of sclerotized papillae on each antero-lateral corner. Paraprocts (Fig. 8) elongate, sensory fields with eight trichobothria (one without basal rosette), marginal cones bifid, asymmetrical. Epiproct almost pyramidal in outline, pigmented; setae as in figure 8.

Measurements (in microns) (Table 1)

Type locality. MEXICO; CHIAPAS: 10 km SE of El Bosque, rd. to Simojovel, 1,340 m., 13.VIII.1975, beating dead, hanging leaves of *Yucca* sp. HOLOTYPE ♂, ALLOTYPE ♀, one PARATYPE ♂ and two PARATYPES ♀.

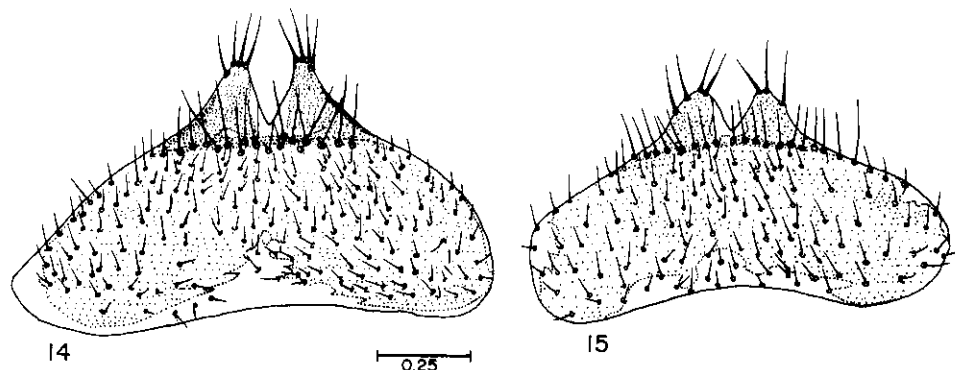
Records. MEXICO; CHIAPAS: 46 km SE of San Cristóbal de las Casas, 1,100 m., 10.VIII.1975, beating mango branches with dead leaves, 2 ♂, 1 ♀.

***Ectopsocus chiapensis* n. sp.**

(Figs. 2, 3, 6, 7, 11-13 and 15)

Female. Color (in 80% alcohol). Body dark brown; compound eyes black, ocelli clear, each with subtle, ochre centripetal crescents; ecdysial sulcus dark brown, without lateral branches. Abdomen with dark brown subcuticular rings.

Morphology. Brachypterous; fore wings setose (Fig. 3) barely reaching the first abdominal segment. Subgenital plate (Fig. 15), with pigmented area concave anteriorly, not cleft in the middle; posterior projections short, stout, distally blunt, each with two apical macrosetae and 1-2 macrosetae on the external margin. A transver-



Figs. 14-15. *Ectopsocus* spp. 14. *E. chiapensis* n. sp. Subgenital plate, ♀. 15. *E. chiapensisoides* n. sp. Subgenital plate, ♀. Scale in mm., common to both figures.

se row of 20 macrosetae towards the posterior projections. Gonapophyses complete (Fig. 12) typical of the genus; a slender pigmented band on each dorsal valve. Paraprocts (Fig. 13), with five trichobothria on sensory fields (one without basal rosette), marginal cones bifid, asymmetrical; setae as in figure 13. Epiproct trapezoid (Fig. 13), with an apical, non-pigmented area; setae as in figure 13.

Measurements (in microns) (Table 1)

Male. Color (in 80% alcohol). Same as the female.

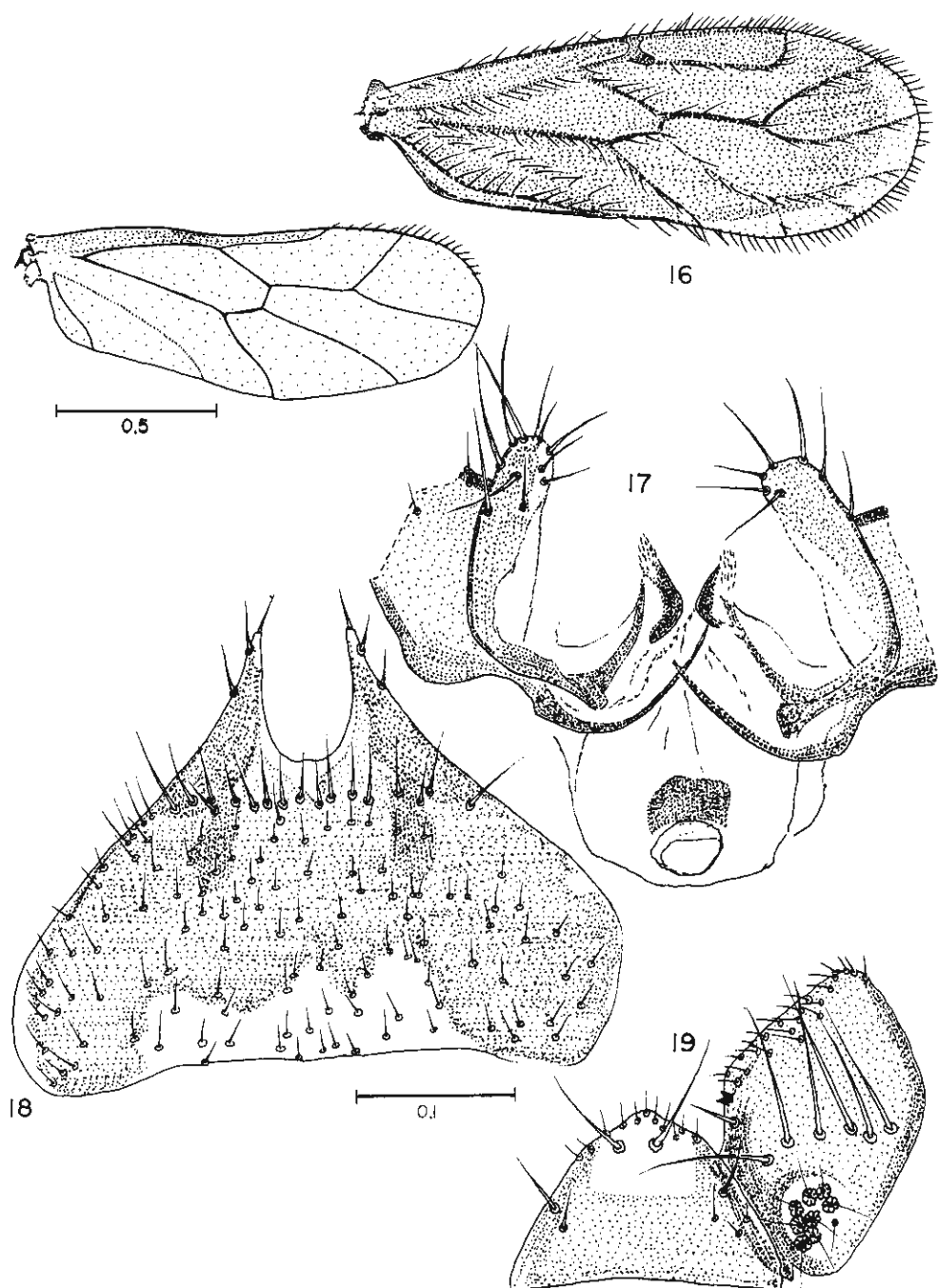
Morphology. Macropterous; fore wing pattern (Fig. 2); hind wings hyaline, with pigmented areas in the membrane and two setae on apical margin of each (Figure 2). Hypandrium as in figure 7. Phallosome (Fig. 6), similar in plan to that of *E. chiapensis*, but stouter, with external parameres decidedly more robust and bent outwards posteriorly. Internal parameres stout, broadly fused apically. Radular sclerites slightly oval, anterior area sclerotized, almost triangular, with the apex directed anteriorly, similar to that of *E. chiapensis*. Ninth abdominal tergite (Fig. 11), with a peripheral, sclerotized band, a posterior comb and a field of sclerotized papillae on each antero-lateral corner, smaller than in *E. chiapensis*. Paraprocts (Fig. 11), with 7-8 trichobothria on each sensory field (one without basal rosette), marginal cones bifid and asymmetrical. Epiproct almost triangular, apically rounded and with a small, irregular, non-pigmented area next to the posterior margin and a larger, non-pigmented area near the base. Setae and pattern of pigmentation of epiproct and paraprocts as in figure 11.

Measurements (in microns) (Table 1)

Type locality. MEXICO: OAXACA: 6 km SE of Nochixtlán, 2,100 m., 10.XI.1977, beating dead, hanging fronds of *Brahea dulcis* palms, HOLOTYPE ♂, ALLOTYPE ♀, and two PARATYPES ♂.

Records. MEXICO: JALISCO: Chamela, UNAM Tropical Biology Station, 18.VII.19881, sifting low forest litter, LML, 1 ♂. PUEBLA: Avila Camacho, ca. Xicotepec de Juárez, 19.XII.1977, beating branches with dead leaves in forest, HB, 1 ♂. 43 km SE of Acatlán, ca. the Puebla-Oaxaca State Line, 20.III.1973, on dead, hanging fronds of *Brahea dulcis* palms, 2 ♂, 1 ♀.

Comments. *E. chiapensis* and *E. chiapensoides* are very similar morphologically, and can be distinguished by the brachyptery of the females of the latter species, and the pattern of coloration of the fore wings in both species: marginal hyaline crescents and two transverse hyaline bands in *E. chiapensis*, and marginal hyaline crescents and hyaline fenestrae in *E. chiapensoides*. The phallosome is considerably more robust in the latter species, and the papillar areas of the ninth abdominal tergite of the males are smaller than in *E. chiapensis*; also the epiproct is almost uniformly pigmented in *E. chiapensis*. There are also differences in the shape and setae of the posterior projections of the subgenital plate (Figs. 14 and 15), and in their pigmentation. The gonapophyses are different, although following the same plan (Figs. 9 and 12). There is, furthermore, a clear geographic separation between the two species. Both species are ascribable to species group *fenestratus* of Thornton & Wong (1968), although both have two setae on the apical margin of each hind wing.



Figs. 16-19. *Ectopsocus eertmoedi* n. sp. ♀. 16. Fore and hind wings; 17. Gonapophyses and ninth sternum; 18. Subgenital plate; 19. Epiproct and left paraproct. Scales in mm. Fig. 17 and 19 to same scale as Fig. 18.

***Ectopsocus eertmoedi* n. sp. (♀)**
(Figs. 16-19)

Female. Color (in 80% alcohol). Body reddish tan; compound eyes black, ocelli clear, with ochre centripetal crescents. Antennae, maxillary palps and legs pale brown; proximal ends of coxae reddish tan. Fore wings with a reddish hue, each with a hyaline peripheral band, extended from R 1+2, along the margin and toward the base of the wing (Fig. 16). Hind wings hyaline. Abdomen with transverse, reddish brown subcuticular rings.

Morphology. Macropterous. Hind wings each with a row of 16-18 setae along the apical margin. Subgenital plate (Fig. 18), with wide pigmented area, irregularly concave anteriorly, with two mesal pigmented areas, one to each side of the longitudinal midline; with 16-18 macrosetae in the transverse row next to the posterior projections, these slender and tapering to apex, each with three macrosetae, one apical and two lateral; each projection strongly pigmented along the external side, the pigmentation coalescing anteriorly with the mesal areas of the plate. Gonapophyses complete (Fig. 17), typical of the genus. Ninth sternite with a large, pigmented, almost rectangular area next to the spermapore and posterior to it. Paraprocts (Fig. 19) semi-elliptical, with 9-10 trichobothria (one without basal rosette), on each sensory field; marginal cones bifid and asymmetrical. Epiproct (Fig. 19), slightly bell-shaped, with a distinct, non-pigmented area posteriorly; setae of epiproct and paraprocts as in figure 9.

Measurements (in microns) (Table 1)

Type locality. MEXICO; VERACRUZ: Los Tuxtlas, Cerro El Vigía, ca. Santiago Tuxtla, 18 km E of junction with Rd. 180, 13.VIII.1973, beating vegetation in forest, GEE, HOLOTYPE ♀, PARATYPE ♀.

Records. MEXICO; VERACRUZ: Los Tuxtlas, UNAM Tropical Biology Station, ca. Montepío, 27.VI.1979, beating branches with dead leaves in forest, 1 ♀. OAXACA: 16 km SE of Valle Nacional, 1,850 m., 11.VII.1986, beating dead, hanging banana leaves, 1 ♀.

Comments. This species is similar to *E. columbianus* Badonne! (1986), from which it can be discriminated by genital details: the pigmented area of the subgenital plate is wide, irregular and shallowly concave anteriorly in *E. eertmoedi*, whereas in *E. columbianus* it is narrow and deeply cleft anteriorly, to form two well defined halves; also in the subgenital plate, the posterior, transverse row of macrosetae, has 16-18 in *E. eertmoedi* and 11 in *E. columbianus*. The transverse, pigmented bars, next to the dorsal valves of the gonapophyses are more elongate and less curved in *E. columbianus*, and this species lacks a distinct, large and almost rectangular pigmented area posterior to the spermapore in the ninth sternum, clearly defined in *E. eertmoedi*. The two species can also be separated on wing features (absence of hyaline margin of fore wings and absence of the row of setae on margin of hind wings in *E. columbianus*).

Ectopsocus formosus n. sp.

(Figs. 20-26)

Female. Color (in 80% alcohol). Body dark brown, head with vertex white; compound eyes black, ocelli clear, with subtle centripetal crescents. Scape dark brown, pedicel dark brown, distally whitish, flagellomeres, maxillary palps and legs hyaline (only proximal ends of coxae dark brown). Fore wings pattern as in figure 20; hind wings hyaline. Abdomen with reddish brown, transverse, subcuticular rings.

Morphology. Hind wings (Fig. 20) each with a row of 18-22 setae along costal and apical margins. Subgenital plate (Fig. 23) broad, with pigmented area deeply cleft anteriorly; 15 macrosetae in transverse row, posterior projections short, stout, each with four apical macrosetae; a non-pigmented area next to the concavity between the projections. Gonapophyses (Fig. 22), with a sclerotized, slender, curved band associated with each dorsal valve. Paraprocts (Fig. 24), semi-elliptical, setose, with 9-10 trichobothria (one without basal rosette), on each sensory field; marginal cones bifid and apices asymmetrical. Epiproct trapezoid (Fig. 24), with a non-pigmented area posteriorly. Setae of epiproct and paraprocts as in figure 24.

Measurements. (in microns) (Table 1)

Male. Color. (in 80% alcohol). Same as the female.

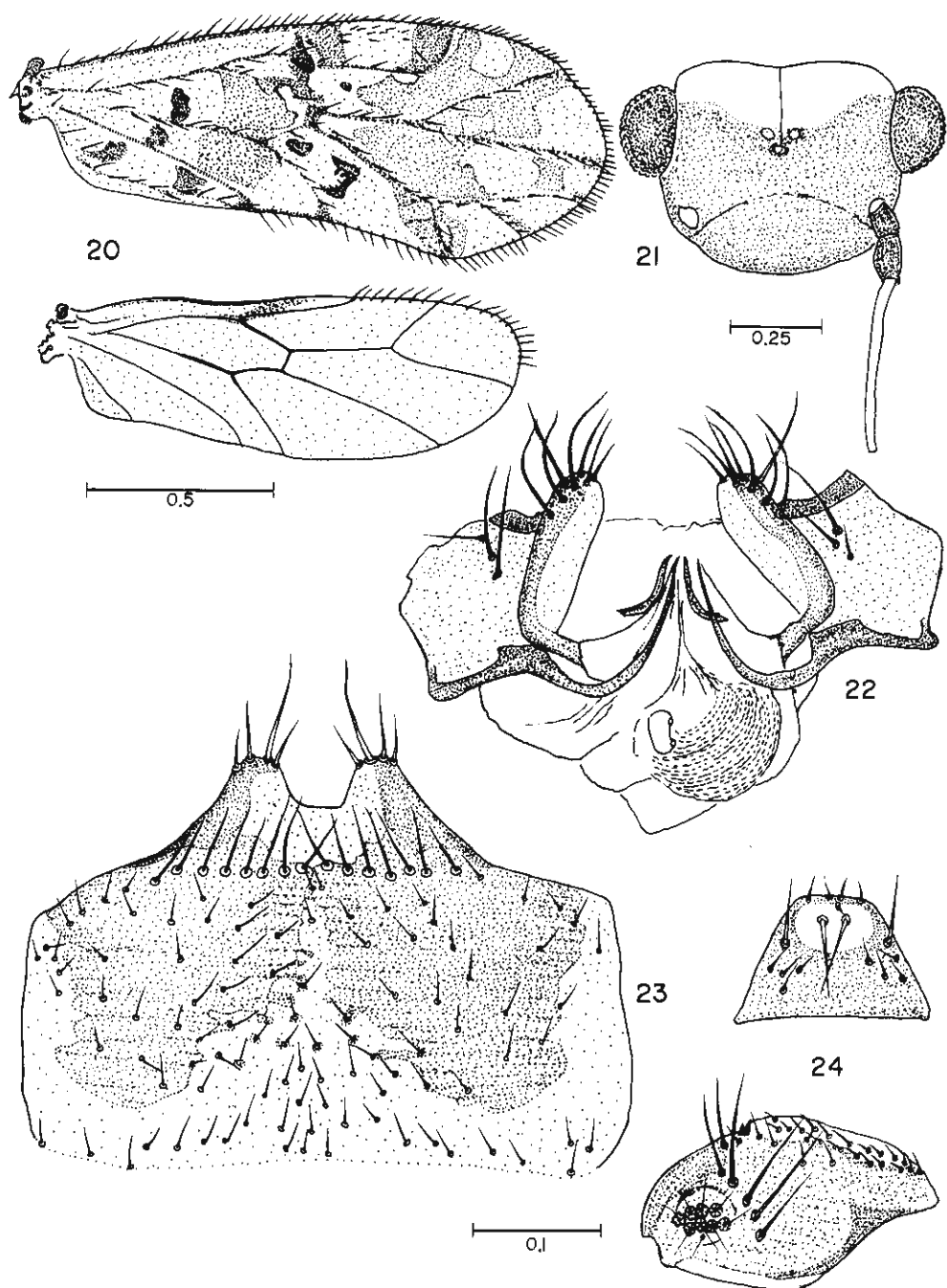
Morphology. Hypandrium (Fig. 25), almost straight posteriorly and with a field of macrosetae along the posterior border. Phallosome (Fig. 25), with external parameres anteriorly connected by a wide bridge; each arm slender and terminally acuminate, with a mesal triangular apophysis projecting from the internal face and irregular, transverse sclerite posteriorly, between the arms of the external parameres; radular sclerites complex, with a coarse anterior membrane covered with small, rectangular, sclerotized areas. Ninth tergite (Fig. 26), with a posterior comb and two anterior fields of papillae, one to each side of longitudinal midline. Paraprocts (Fig. 26), elongate, with 9-10 trichobothria (one without basal rosette), on each sensory field; marginal cones bifid and asymmetrical. Epiproct (Fig. 26), almost triangular. Setae of epiproct and paraprocts as in figure 26.

Measurements (in microns) (Table 1).

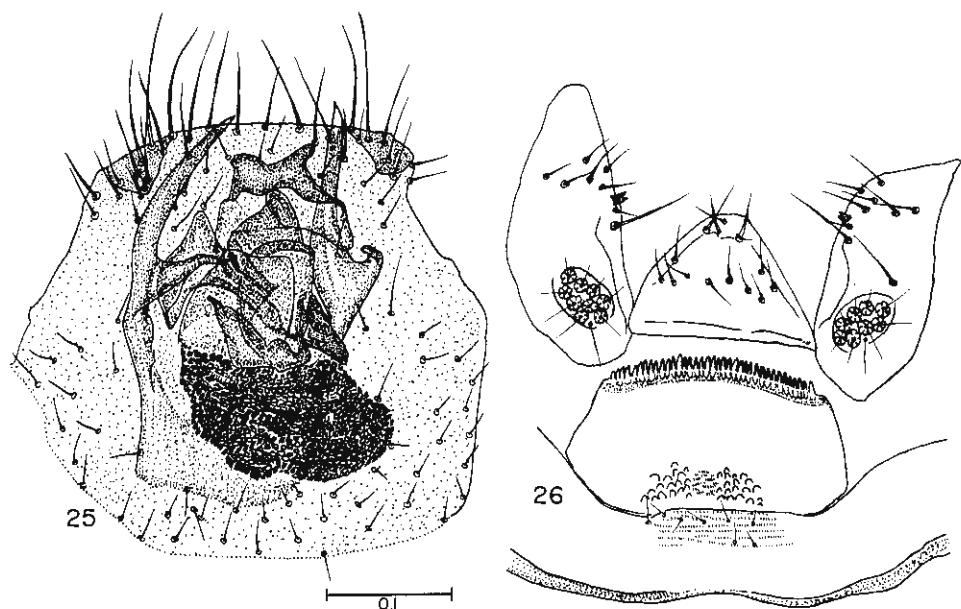
Type locality. MEXICO; JALISCO: Chamela, UNAM Tropical Biology Station, 3.XI.1979, beating foliage of trees and shrubs in forest, DY, HOLOTYPE ♂, 22.IV.1980, beating foliage in forest, DY, ALLOTYPE ♀, 1.III.1980, beating dead branches in forest, DY, PARATYPE ♀.

Records. MEXICO; JALISCO: ca. Tenacatita (Angeles Locos), 22.IV.1980, beating dead fronds of *Orbygnia* palm, 1 ♀. NAYARIT: Isla María Madre, ca. Campamento Nayarit, 29.III.1984, beating branches of lemon tree, 1 ♀. VERACRUZ: Los Tuxtlas, 4 km NE of Catemaco, 16.VII.1973, beating branches in forest, 1 ♀. Col. Ruiz Cortines, ca. Montepío, 22.XII.1984, beating branches of orange tree, 1 ♀.

Comments. This species is assignable to species group *denervus* of Thornton & Wong (1968); it is similar in genital structure, both of males and females, to *E. psychodelicus* Turner (1975), from Jamaica, but the two species are distinguished in that the pattern of coloration of the fore wings are different: fenestrae, large dark areas and small pigmented spots in *E. formosus*, and one large dark area in *E.*



Figs. 20-24. *Ectopsocus formosus* n. sp. ♀. 20. Fore and hind wings; 21. Dorsal view of head; 22. Gonapophyses and ninth sternum; 23. Subgenital plate; 24. Epiproct and left paraproct. Scales in mm. Figs. 22 and 24 to same scale as Fig. 23.



Figs. 25-26. *Ectopsocus formosus* n. sp. ♂. 25. Hypandrium and phallosome; 26. Clunium, epiproct and paraprocts. Scale in mm., common to both figures.

psychodelicus. The vertex of the head is almost white in *E. formosus*, with the rest of the head distinctly brown, whereas the head is brown throughout in *E. psychodelicus*; the subgenital plate of this species is clearly reminiscent to that of *E. formosus*, but its illustration by Turner (1975, Fig. 91), is too schematic and does not allow a closer comparison, and the same applies to the gonapophyses (see Fig. 22 and Fig. 92 of Turner, 1975). The phallosomes of both species are clearly built on the same plan (see Fig. 25 and Fig. 93 of Turner, 1975), but the posterior transverse sclerite is wider than long and not U-shaped in *E. formosus*, and also this species lacks an elongate, longitudinally oriented sclerite, with a row of strongly sclerotized teeth, conspicuously present in *E. psychodelicus*.

Ectopsocus maindroni Badonnel

E. maindroni Badonnel, 1935, p. 81
 Synonymy in Smithers, 1967, p. 66.

This is a pantropical species, originally described from Arabia and presently known from the Oriental, Pacific, Palearctic, Aethiopian, Nearctic and Neotropical Regions. In the Americas it has been recorded in the south of Florida, coast of Texas, Gulf coast of México, and in Jamaica, Puerto Rico, Cuba, Venezuela, Guyana and French Guiana (Mockford, 1974). In México it has been recorded in the states of Chiapas, Guerrero, Yucatán, Veracruz and Jalisco. The individual records are too numerous to be cited.

Ectopsocus meridionalis Ribaga

E. meridionalis Ribaga. (Enderlein, 1907, p. 101)

Synonymy in Smithers, 1967, p. 66.

This species is widely distributed, having been recorded in the Oriental, Palearctic, Nearctic, Neotropical and Aethiopian regions. It belongs in the *E. briggsi* complex, studied by Mockford (1959); it is parthenogenetic and can be separated from the females of *E. briggsi* McLachlan by genital details (apical lobes of subgenital plate long, straight, with a line extending forward from the inner base of each lobe; the two prongs of the double paraproctal cone markedly uneven in length in *E. meridionalis*. In *E. briggsi* the apical lobes of the subgenital plate are relatively shorter, decidedly curved inward, and each ends in a smooth-margined process between the inner two setae. The two prongs of the double paraproctal cone are nearly equal in length). In Mexico, it has been recorded in the states of Chiapas, Distrito Federal, Guerrero, Hidalgo, Jalisco, México, Morelos, Nuevo León, Oaxaca, Puebla, San Luis Potosí and Veracruz. The individual records are too numerous to be cited.

Ectopsocus mexicanus n. sp.

(Figs. 27-32)

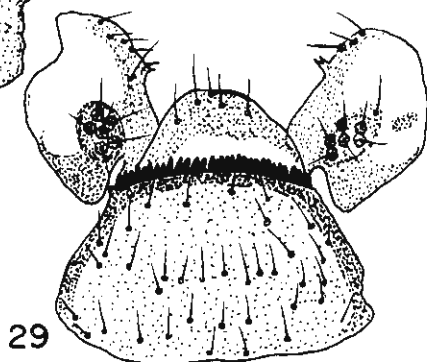
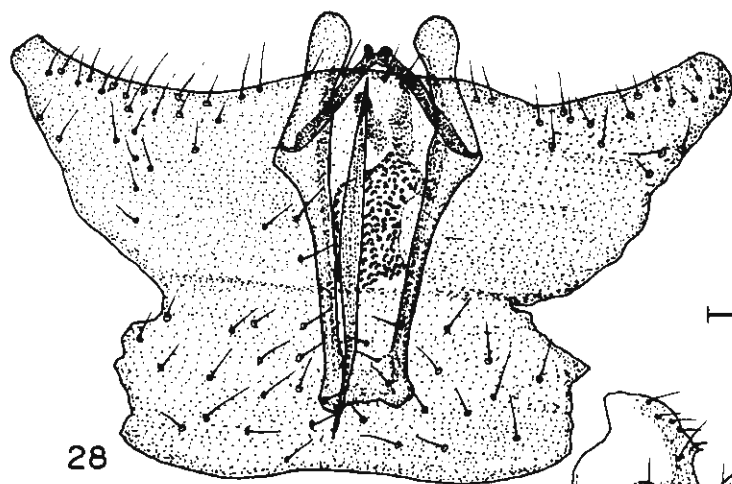
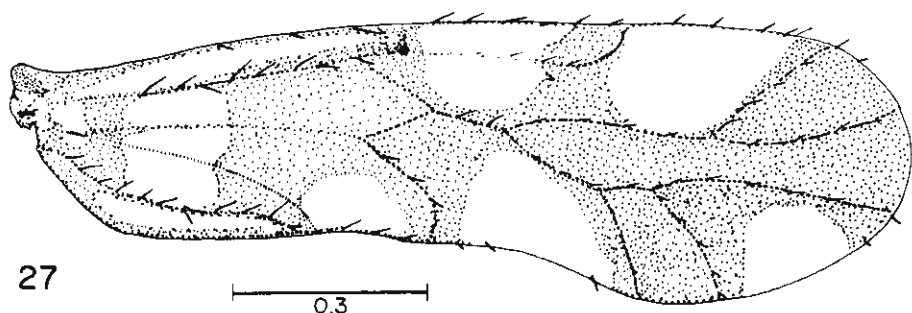
Female. Color. (in 80% alcohol). Body dark brown; compound eyes black, ocelli clear, with ochre centripetal crescents. Antennae, maxillary palps and legs pale brown (proximal ends of coxae dark brown). Fore wings dark brown, with hyaline marginal crescents and hyaline areas in the membrane (Fig. 27). Hind wings hyaline, with dark brown areas (Fig. 27). Abdomen with transverse reddish brown subcuticular rings.

Morphology. Subgenital plate (Fig. 32), broad, with pigmented area deeply cleft anteriorly; with 21 macrosetae in a transverse, irregular, posterior row; broadly concave posteriorly and with 3-4 macrosetae on each posterior projection, two apical and one or two in the external margins, and with a hyaline band along the posterior concavity. Gonapophyses (Fig. 30), typical of the genus. Paraprocts (Fig. 31), semi-elliptical, with six trichobothria (one without basal rosette), on each sensory field; marginal cones small, with a single apex. Epiproct trapezoid (Fig. 31). Setae of epiproct and paraprocts as in figure 31.

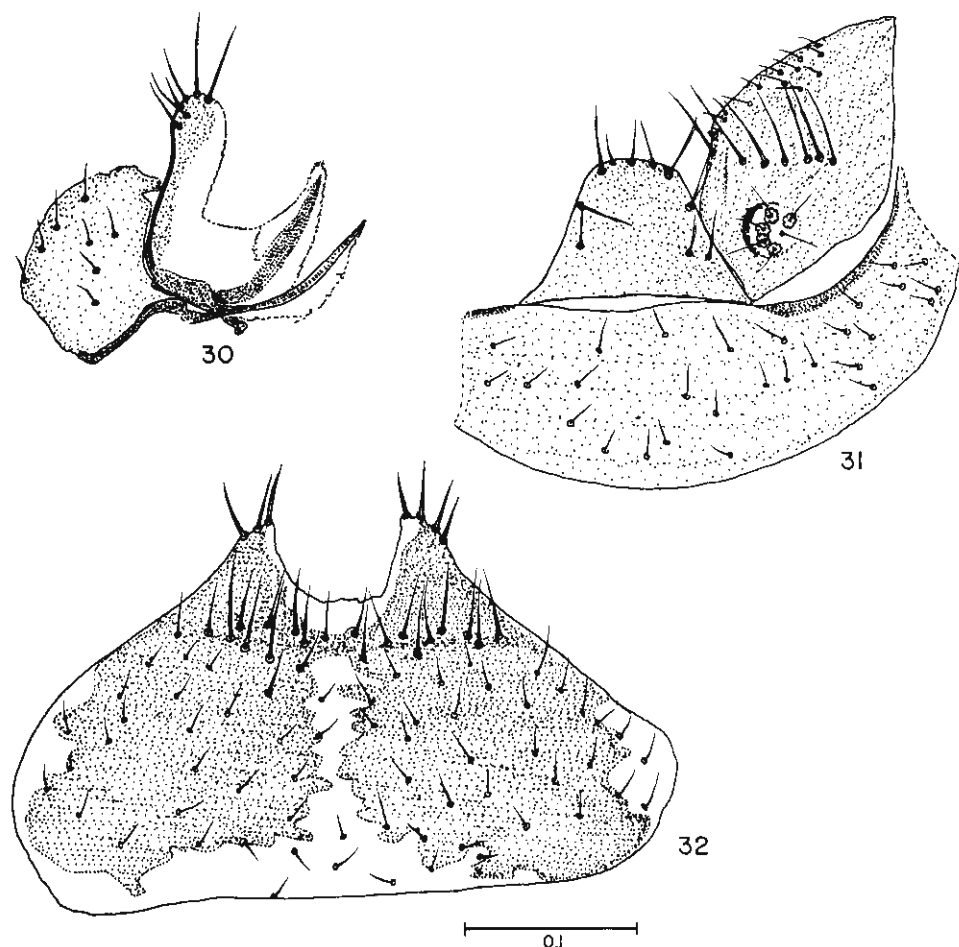
Measurements. (in microns) (Table 1)

Male. Color (in 80% alcohol). Same as the female.

Morphology. Hypandrium extended postero-laterally (Fig. 28), with fields of setae along the posterior margin. Phallosome (Fig. 28), with external parameres long and slender anteriorly, and short, stout, and distally blunt posteriorly. Internal parameres fused posteriorly to form a triangular arch, open anteriorly. Radula membranous, with a papillate area, and an elongated, longitudinal, sclerotized spindle medially (Fig. 28). Ninth abdominal tergite with a sclerotized band along lateral and posterior margins, and a comb along the posterior margin (Fig. 29). Paraprocts (Fig. 29) with six trichobothria on sensory fields; marginal cones bifid,



Figs. 27-29. *Ectopsocus mexicanus* n. sp. ♂. 27. Fore and hind wings; 28. Hypandrium and phallosome; 29. Clunium, epiproct and paraprocts. Scales in mm. Fig. 29 to same scale as Fig. 28.



Figs. 30-32. *Ectopsocus mexicanus* n. sp. ♀. 30. Gonapophyses; 31. Clunium, epiproct and left paraproct; 32. Subgenital plate. Scale in mm., common to all figures.

with pigmented bands along margins next to epiproct. Epiproct (Fig. 29), almost trapezoid, with a non-pigmented area basally. Setae and pigmentation of epiproct and paraprocts as in figure 29.

Measurements, (in microns) (Table 1).

Type locality. MEXICO; NAYARIT: María Madre Island, ca. Campamento Venustiano Carranza, towards Arroyo Hondo Springs, 90 m., 28.III.1984, sifting *Ficus* sp. litter, holotype ♂, allotype ♀. Road from Puerto Balleto to La Antena, 210-550 m., 26.III.1984, sifting litter and beating branches in forest, 2 ♂, 2 ♀, PARATYPES. Arroyo Platanar, ca. Campamento San Juan Papelillo, 29.III.1984, sifting litter, 5 ♀, PARATYPES.

Records. MEXICO; CHIAPAS: 5 km W of Ocozocoutla, 720 m., 9.VIII.1975, beating branches of shrubs with dead leaves, BGG, 1 ♂, JALISCO: Chamela, UNAM Tropical

Biology Station, 27.II.1980, sifting low forest litter, DY 1 ♂ . 21.VI.1979, beating dead hanging fronds, of *Orbygnia* palms, 1 ♂ , 22.IX.1980, 2 ♂ , 3.VII.1980, sifting mangrove litter, ca. Arroyo Chamela, 1 ♂ , 29.IV.1981, sifting low forest litter, 1 ♂ .

Comments. The fore wing pattern of coloration of this species, resembles those of *E. lambus* Thornton, *E. perkinsi* Banks, *E. fullawayi* Enderlein, *E. spilotus* Thornton & Wong, *E. dialeptus* Thornton & Wong, and *E. fenestratus* Thornton & Wong, from the Pacific region; it is also similar to *E. gracilis* Thornton & Wong, from New Zealand. *E. mexicanus* can be distinguished from them on genital characters, and by details of the fore wing pattern; it is assignable to species group *fenestratus* of Thornton & Wong (1968).

***Ectopsocus obscurus* n. sp.**
(Figs. 33-38)

Female. Color (in 80% alcohol). Body ochre brown. Compound eyes black, ocelli clear, with ochre centripetal crescents. Antennae pale brown. Wings opaque, with a reddish-brown hue. Abdomen with transverse, pale brown subcuticular rings.

Morphology. Subgenital plate (Fig. 36), broad, with pigmented area deeply cleft anteriorly; with 14-16 macrosetae on posterior transverse row; posterior projections short, stout, terminally pointed, each one with four macrosetae, two apical and two on the external margin, each with an elongated, longitudinal, pigmented spindle underlying the surface. Gonapophyses (Fig. 35), with dorsal valves each with a mesal, triangular, hyaline projection. Paraprocts almost elliptical (Fig. 34), with 8-9 trichobothria (one without basal rosette), on each sensory field; marginal cones single. Epiproct trapezoid (Fig. 34), with a non-pigmented area next to posterior margin; setae of epiproct and paraprocts as in figure 34.

Measurements. (in microns) (Table 1)

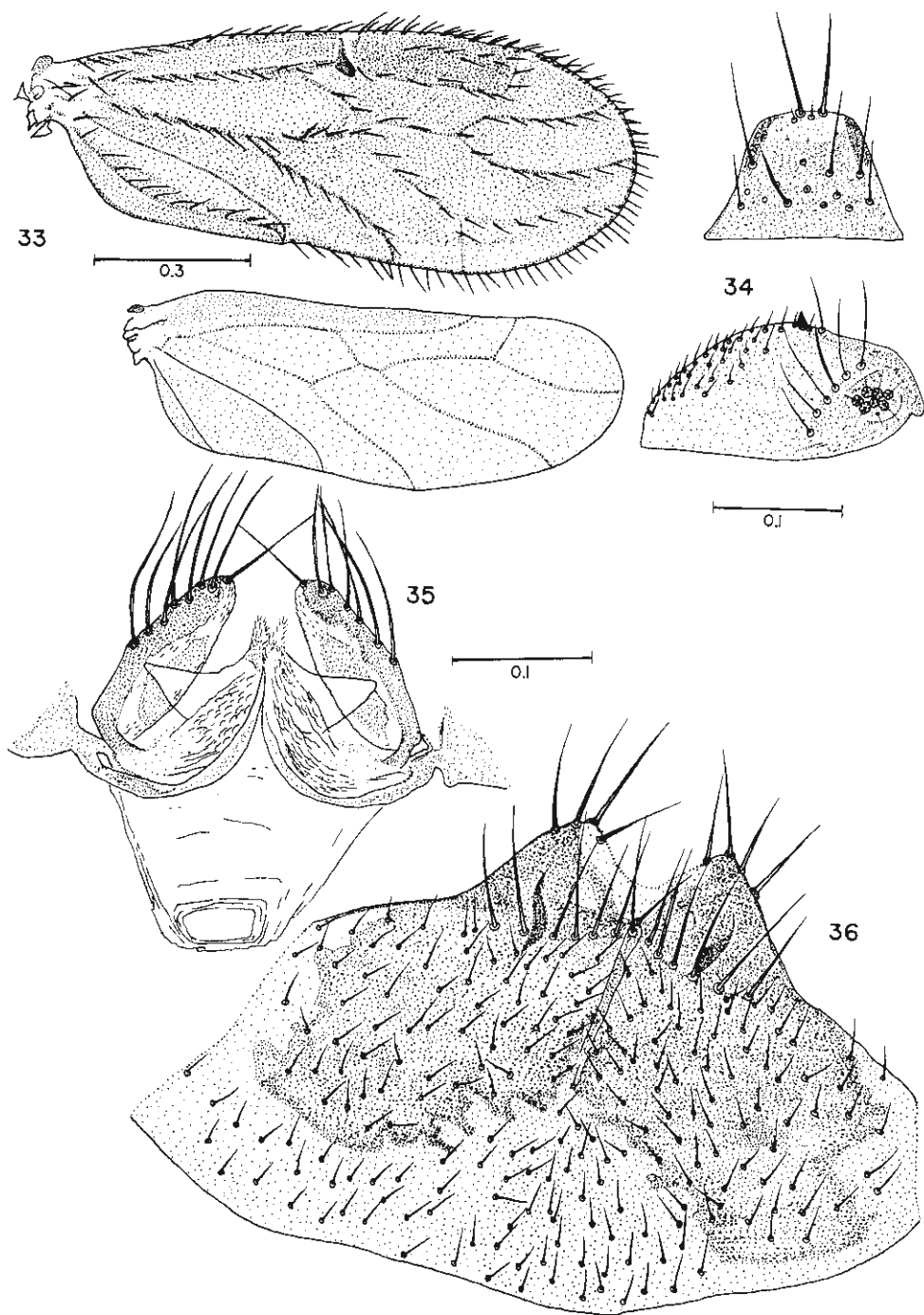
Male. Color (in 80% alcohol). Same as the female.

Morphology. Hypandrium broad (Fig. 37), almost rectangular, setose, with two rounded, posterior, setose projections, one to each side of longitudinal midline, with a field of macrosetae on each postero-lateral corner. Phallosome complex (Fig. 37), with external parameres terminally acuminate, a posterior transverse sclerite, and three irregular radular sclerites, one of them U-shaped, with one end blunt and the other acuminate. Radula distinct (Fig. 37). Ninth abdominal tergite with a comb along the posterior margin (Fig. 38). Paraprocts proximally rounded, with eight trichobothria (one without basal rosette), on each sensory field; marginal cones bifid, asymmetrical. Epiproct rounded posteriorly, almost totally pigmented; setae and pigmentation of epiproct and paraprocts as in figure 38.

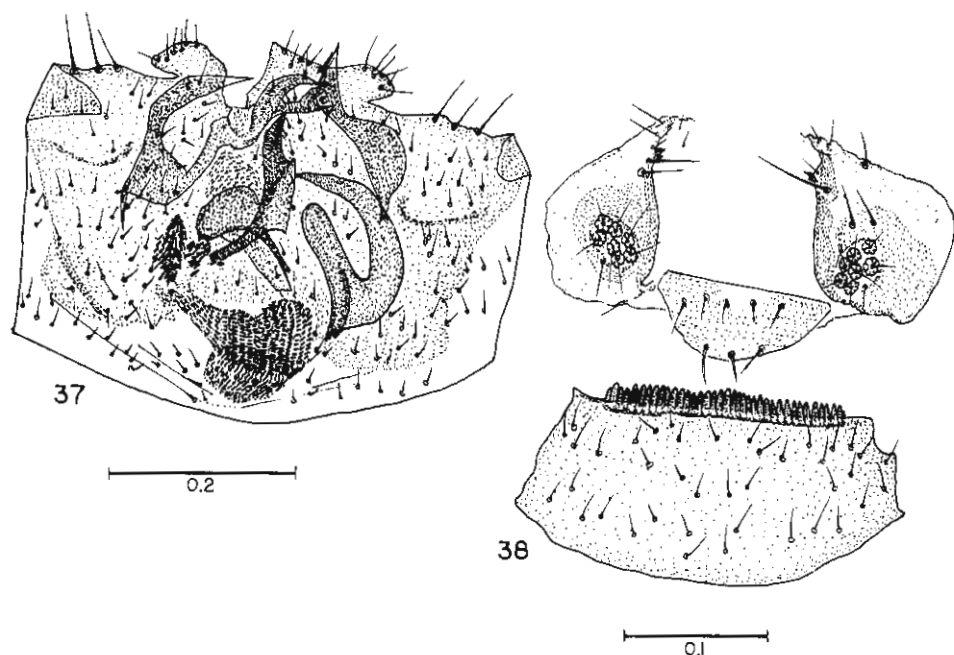
Measurements (in microns) (Table 1)

Type locality. MEXICO: JALISCO: Chamela, UNAM Tropical Biology Station, 19.VIII.1979, beating branches of shrubs with dead leaves in forest, DY, HOLOTYPE ♂ , ALLOTYPE ♀ , and one PARATYPE of each sex. Arroyo Chamela, 12.IX.1987, on abandoned hanging nest of the Yellow Winged Cacique (*Cassiculus melanicterus*: Aves), 31 ♂ , 28 ♀ , PARATYPES.

Records. MEXICO: JALISCO: Chamela, UNAM Tropical Biology Station,



Figs. 33-36. *Ectopsocus obscurus* n. sp. ♀. 33. Fore and hind wings; 34. Epiproct and right paraproct; 35. Gonapophyses and ninth sternum; 36. Subgenital plate. Scales in mm.



Figs. 37-38. *Ectopsocus obscurus* n. sp. ♂. 37. Hypandrium and phallosome; 38. Clunium, epiproct and paraprocts. Scales in mm.

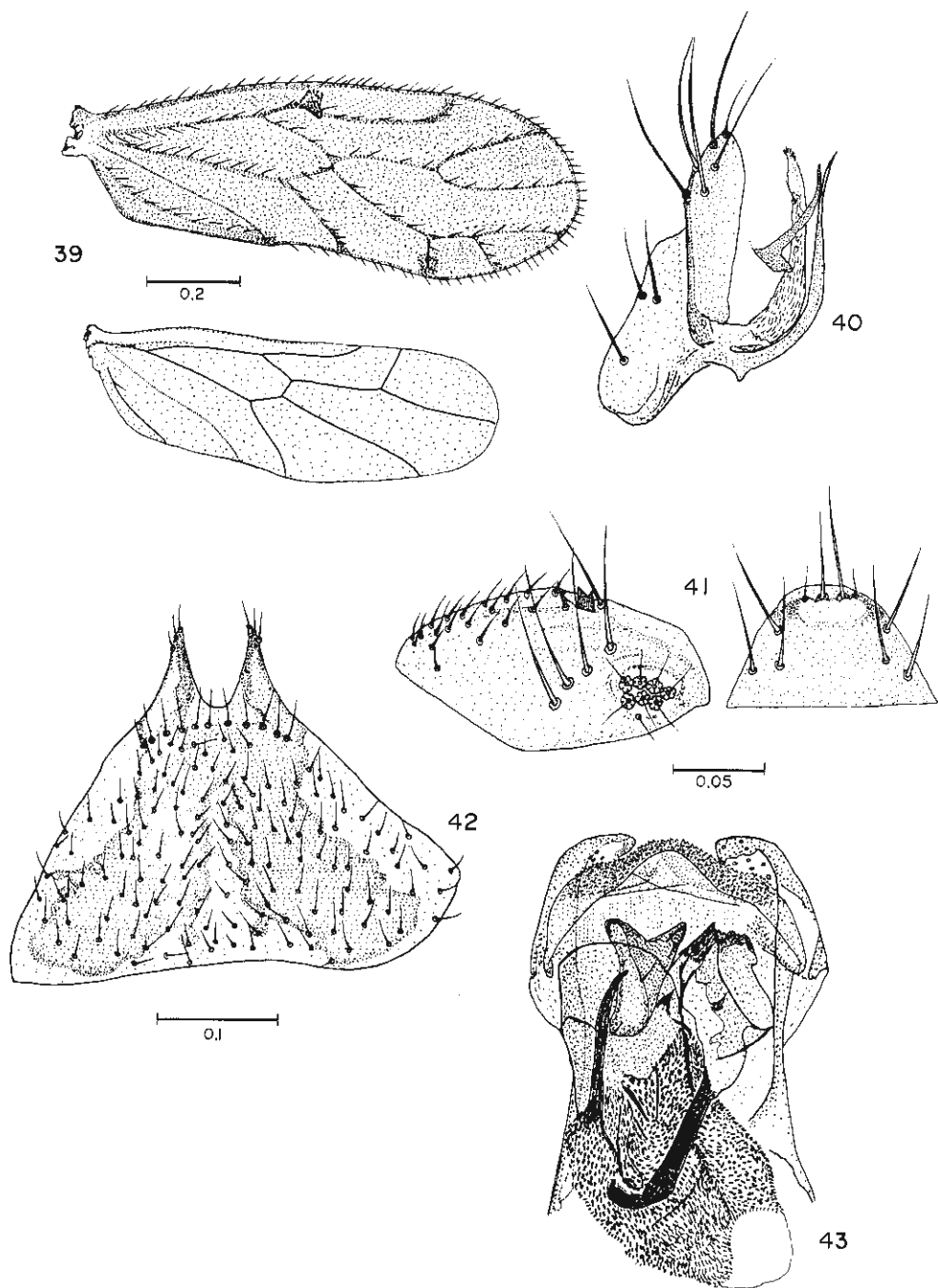
30.VI.1980, sifting low forest litter, 1 ♀. Manglar de las Salinas, ca. Chamela, 22.X.1980, beating mangrove branches with abundant hanging bromeliads, 1 ♂. 17 km SE of junction to Tomatlán, 3.XII.1980, beating branches with dead leaves, felled trees, 1 ♀. OAXACA: 8 km E of La Ventosa Jct., 23.VIII.1973, beating dead, hanging fronds of fan palms, 1 ♀. 34 km SW of Oaxaca City, towards Puerto Escondido, 4.II.1980, on dead, hanging leaves of *Agave* sp., 6 ♀, 2 ♂.

Comments. This species is assignable to species group *ornatus* of Thornton & Wong (1968); the phallosome has a very prominent sickle-shaped radular sclerite, and a smaller sclerite, less curved, but also acuminate. Other species in the group *ornatus* are *E. ornatus* Thornton, *E. ornatoides* Thornton & Wong, *E. spilotos* Thornton & Wong, *E. dialeptus* Thornton & Wong, and *E. yucatanus* n. sp., *E. obscurus* can be distinguished from them in that it has very dark fore wings, without hyaline fenestrae, these being present in *E. ornatus*, *E. ornatoides*, *E. spilotos* and *E. dialeptus*; also, it has two prominent lobes on the posterior border of the hypandrium, this character being absent in the other species: *E. obscurus* can be separated from *E. yucatanus* in that the latter has small, pale, unfenestrated fore wings, and the former lacks a papillar field in the apical abdominal tergite.

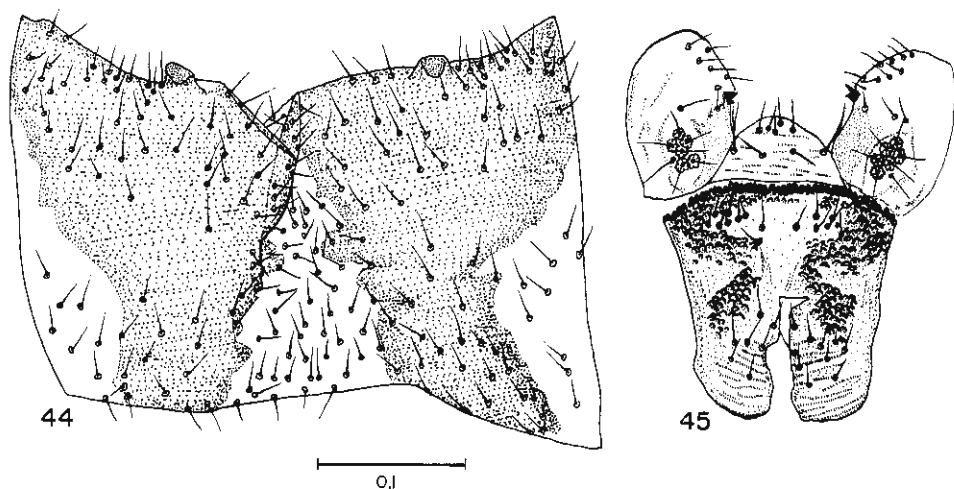
***Ectopsocus pacificus* n. sp.**

(Figs. 39-45)

Female. Color. (in 80% alcohol). Body pale brown, compound eyes black, ocelli



Figs. 39-43. *Ectopsocus pacificus* n. sp. 39. Fore and hind wings, ♀; 40. Gonapophyses, ♀; 41. Epi-proct and right paraproct, ♀; 42. Subgenital plate, ♀; 43. Phallosome, ♂. Scales in mm. Figs. 40 and 43 to same scale as Fig. 41.



Figs. 44-45. *Ectopsocus pacificus* n. sp. ♂. 44. Hypandrium; 45. Clunium, epiproct and paraprocts. Scale in mm., common to both figures.

clear, with dark brown centripetal crescents. Fore wings opaque, with small pigmented spots at distal ends of pterostigma, R2+3, R4+5, M1, M2, M3, Cu, and Ax; hind wings hyaline (Fig. 39).

Morphology. Subgenital plate (Fig. 42), with pigmented area deeply cleft anteriorly, 10-12 macrosetae on transverse posterior row, and posterior projections slender, each with three macrosetae. Gonapophyses as in figure 40, typical of the genus. Paraprocts almost elliptical (Fig. 41), with eight trichobothria (one without basal rosette), on each sensory field; marginal cones bifid and asymmetrical. Epiproct trapezoid (Fig. 41), with a non pigmented area next to the apex; setae and pigmentation of epiproct and paraprocts as in figure 41.

Measurements (in microns) (Table 1)

Male. Color (in 80% alcohol). Same as the female.

Morphology. Hypandrium (Fig. 44), almost rectangular, setose; pigmented area deeply cleft and obtusely concave anteriorly; posterior margin with a small, sclerotized, rounded projection between the longitudinal midline and each postero-lateral corner. Phallosome (Fig. 43), elongate, external parameres slender anteriorly and with a basal bridge between them; distal ends stout, terminally rounded, bent inwards. A posterior, transverse, convex bridge, between the external parameres; surface with dense field of short, stout spines. Radular sclerites complex (Fig. 43). Ninth abdominal tergite elongate, with a comb along the posterior margin and a sinous field of papillae on each side of the longitudinal midline (Fig. 45). Paraprocts almost elliptical, with seven trichobothria (one without basal rosette), on each sensory field; marginal cones bifid, asymmetrical (Fig. 45). Epiproct posteriorly rounded, setose; setae and pigmentation of epiproct and paraprocts as in figure 45.

Measurements (in microns) (Table 1)

Type locality. MEXICO; JALISCO: Chamela, UNAM Tropical Biology Station,

20.VI. 1981, sifting litter, Arroyo La Huerta, HOLOTYPE ♂, ALLOTYPE ♀, one PARATYPE of each sex.

Records. MEXICO: JALISCO: ca. La Manzanilla Beach, 15 km NW of Melaque, 21.VI.1979, beating shrub branches with dead leaves, DY, 1 ♂, 1 ♀. Arroyo Chamela, 19.VI.1979, beating mangrove branches with dead leaves, DY, 2 ♀, 1 ♂; sifting mangrove litter, 1 ♂. UNAM Tropical Biology Station, 18.VI.1979, sifting litter, 2 ♂, 2 ♀; 3.XI.1979, beating trees and shrubs in forest, DY, 1 ♀; 26.II.1980, sifting litter, 1 ♀; 22.X.1980, beating foliage in forest, 1 ♀; 26.IV.1981, sifting litter, 1 ♂. GUERRERO: Ixtapa, ca. Zihuatanejo, 15.V.1975, sifting mangrove litter, 1 ♀.

Comments. This species, on genital characters, is assignable to species group *fenestratus* of Thornton & Wong (1968), although it does not have fenestrated fore wings. It can be separated from *E. fenestratus* and from *E. erosus* by this character, and also by the presence, in *E. pacificus*, of a field of microspines along the outer surface of the posterior keel-like sclerite of the phallosome, other phallosome sclerites are different in both species, but the structure responds to the same plan of organization.

Ectopsocus richardsi (Pearman)

Chaetopsocus richardsi Pearman, 1929, p. 105

This species was originally described from specimens collected in London, U.K., on cacao from unknown localities in West Africa. It belongs in species group *hirsutus* of Thornton & Wong (1968), and is now known to have a wide distribution; it has been recorded, besides Africa and England, in Texas, Hawaii, Hong Kong and the Galapagos Archipelago, frequently associated with stored grains or foodstuffs. In Mexico, it is known from the state of Quintana Roo, in the Yucatán Península; 21.XII.1983, on stored corn in warehouse, 2 ♀.

Ectopsocus thibaudi Badonnel

E. thibaudi Badonnel, 1979, p. 52.

This species was originally described from Guadeloupe, in the Lesser Antilles, and has also been recorded on the islands of Marie Galante and Saint Lucie (Badonnel, 1979; 1981). It is close to *E. boharti* Thornton & Wong (1968), from the Bonin Islands (Micronesia), and as *E. richardsi*, belongs in species group *hirsutus* of Thornton & Wong. Additional records for this species are the following: MEXICO: VERACRUZ: Los Tuxtlas, UNAM Tropical Biology Station, 16.VIII.1987, beating branches with dead leaves, fallen trees, 1 ♂, 1 ♀. 28 km SE of Paso del Toro, 29.VI.1979, beating dead, hanging fronds of *Sabal mexicana* palms, 1 ♂. YUCATÁN: 8 km E of Progreso, towards Telchac, 14.VII.1986, on dead, hanging fronds of fan palms, 1 ♂. USA: FLORIDA: Monroe Co., Upper Key Largo, 18.II.1975, Berlese, nest of *Neotoma floridana*, CWOB, 2 ♂, 2 ♀.

Ectopsocus thorntoni n. sp. (♀)
(Figs. 46-49)

Female. Color (in 80% alcohol). Body pale brown, head with vertex white. Antennae hyaline, except for the scape and pedicel, which are pale brown. Legs white. Fore wings with hyaline and dark brown areas, with pattern as in figure 46. Abdomen with transverse, pale brown subcuticular rings.

Morphology. Hind wings with a row of 14-16 setae along the apical margin (Fig. 46). Subgenital plate with pigmented area broad and irregularly concave anteriorly, 14 macrosetae in transverse posterior row, and posterior projections strongly pigmented, apically truncate, each with three macrosetae, two apical and one on the external margin (Fig. 47). Gonapophyses as in figure 48, complete, typical of the genus. Ninth sternum elongate, almost straight anteriorly. Paraprocts almost elliptical (Fig. 49), with nine trichobothria (one without basal rosette), on each sensory field; marginal cones bifid and asymmetrical. Epiproct trapezoidal (Fig. 49), with a non-pigmented area apically; setae and pigmentation of epiproct and paraprocts as in figure 49.

Measurements (in microns) (Table 1)

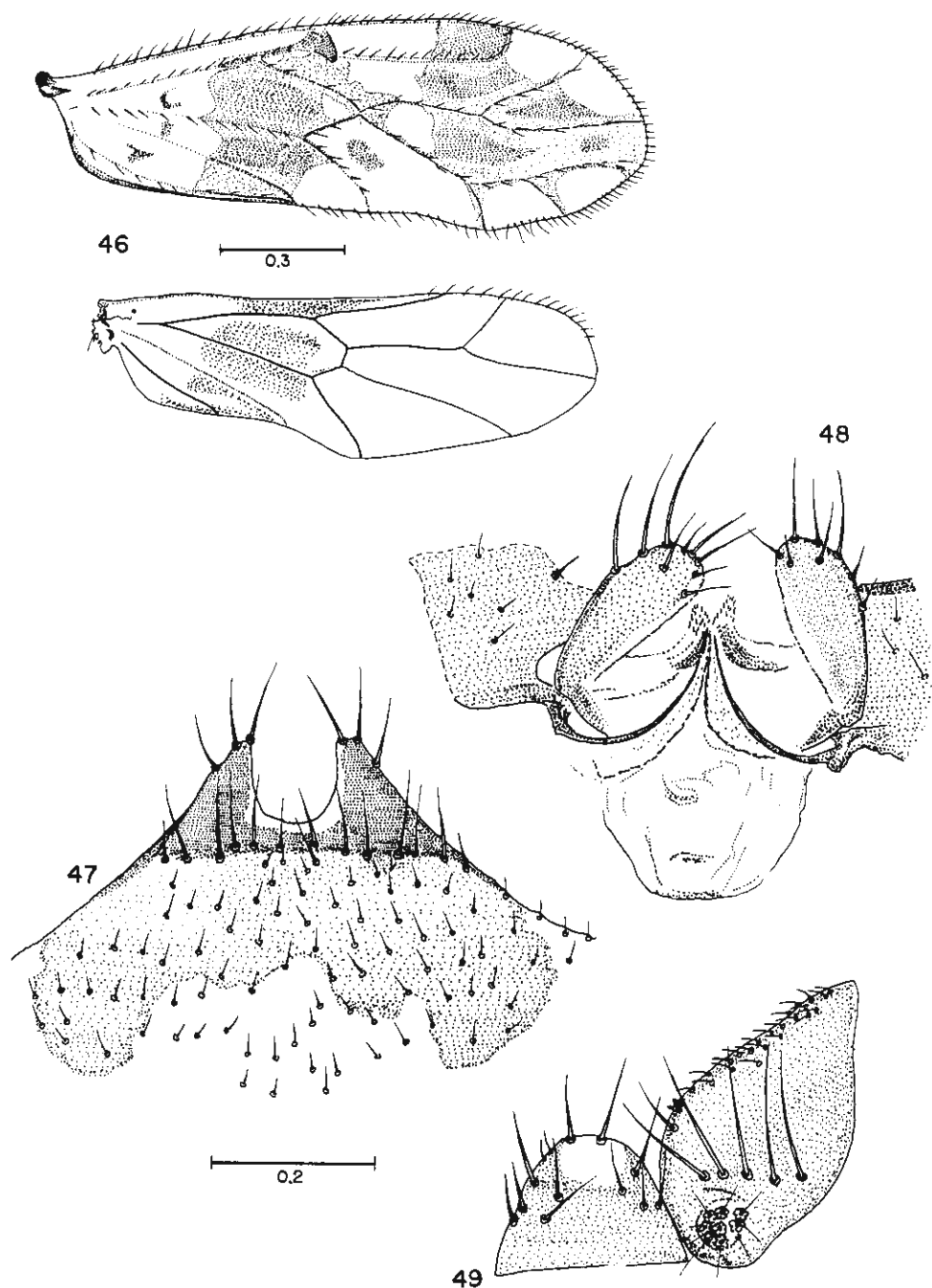
Type locality. MEXICO; VERACRUZ: Los Tuxtlas, ca. Montepio, 18.VIII.1987, beating tree branches on forest edge, IWB, HOLOTYPE ♀ .

Comments. This species can be discriminated from others in the genus by genitalic features and by the pattern of the wings; it is close to *E. formosus* and also belongs in species group *denervus* of Thornton & Wong (1968). The subgenital plate is unique in that the area posterior to the transverse row of macrosetae is strongly pigmented; also the apical lobes show an unpigmented area along the inner margins, that widens a little next to the concavity between the two lobes.

Ectopsocus titschacki Jentsch

E. titschacki Jentsch, 1939, p. 120

This is a pantropical species, widely distributed and recorded in several localities in West Africa, Palawan, Hawaii, Puerto Rico, Trinidad, Surinam, Guyana, French Guiana, Brazil, Venezuela, Martinique, Dominica, Marie Galante, Cuba, Guatemala and Mexico (Mockford, 1974; Badonnel, 1981). It belongs in species groups *titschacki*, of Thornton & Wong (1968). The Mexican records available are the following; CHIAPAS: Palenque Archaeological Zone, 100 m., 12.VII.1986, beating *Heliconia* in forest, 2 ♀ , 13 km S of Ixtacomitán, 410 m., 13.VIII.1975, beating branches with dead leaves in forest, 4 ♀ , 1 ♂ . VERACRUZ: 4 km W of Yanga, 660 m., 15.VII.1975, beating dead hanging leaves of *Yucca* in coffee plantation, 2 ♂ . Los Tuxtlas, 4 km W of Catemaco, 16.VII.1973, beating trees in forest patch, 12 ♀ , 8 ♂ . 6 km NE of San Andrés Tuxtla, towards San Martín volcano, 15.VII.1973, beating dead hanging leaves of *Agave* in lava flow, 2 ♀ . UNAM Tropical Biology Station, 19-21.XII.1984, beating branches with dead leaves in forest, 14 ♀ , 15 ♂ . 16-17.VII.1987, beating branches with dead leaves, fallen trees in forest, 9 ♀ , 3 ♂ .



Figs. 46-49. *Ectopsocus thorntoni* n. sp. ♀. 46. Fore and hind wings; 47. Subgenital plate; 48. Gonapophyses and ninth sternum; 49. Epiproct and left paraproct. Scales in mm. Figs. 48 and 49 to same scale as Fig. 47.

Ectopsocus tuxtларum n. sp. (♀)

(Figs. 50-55)

Female. Color (in 80% alcohol). Body pale tan; compound eyes black, ocelli clear, without pigmented centripetal crescents. Antennae and legs pale tan. Fore wings slightly opaque, hind wings hyaline. Abdomen with brown, transverse, subcuticular rings.

Morphology. Subgenital plate (Fig. 52), with pigmented area slightly cleft anteriorly, also with a rounded mesal area of different texture from the rest of the surface; with seven macrosetae on transverse row, and two mesal macrosetae. Posterior projections stout, terminally truncate, each with two strong spines in the apex, the external shorter than the internal, and three or four macrosetae along each external margin (Fig. 52) Gonapophyses (Fig. 53), with a slender, curved, sclerotized band, associated with each dorsal valve; external valves stout, apically rounded and slightly constricted in the middle. Paraprocts almost elliptical (Fig. 51), with 11 trichobothria (one without basal rosette), on each sensory field, and marginal cones simple (Fig. 54). Epiproct trapezial (Fig. 55), with a non-pigmented area next to the apex; setae and pigmentation of epiproct and paraprocts as in figures 51 and 55.

Measurements (in microns) (Table 1)

Type locality. MEXICO; VERACRUZ: Los Tuxtlas, Cerro el Vigía, 6 km NE of Santiago Tuxtla, 3 km W of junction with Hwy. 180, 12.VII.1973, beating branches with dead leaves in forest, HOLOTYPE ♀ .

Comments. This species is similar to *E. vilhenai* Badonnel and to *E. cinctus* Thornton, from which it can be distinguished by the marginal cones of the paraprocts and by the apical spines of the posterior projections of the subgenital plate (simple and two spines, respectively, in *E. tuxtларum*). *E. vilhenai* has been collected 90 km NW of Santiago Tuxtla, and *E. cinctus* is an Oriental and Australian species, known from India, Hong Kong, Malaya, Viet Nam, Lombok and Western Australia.

Ectopsocus vachoni Badonnel

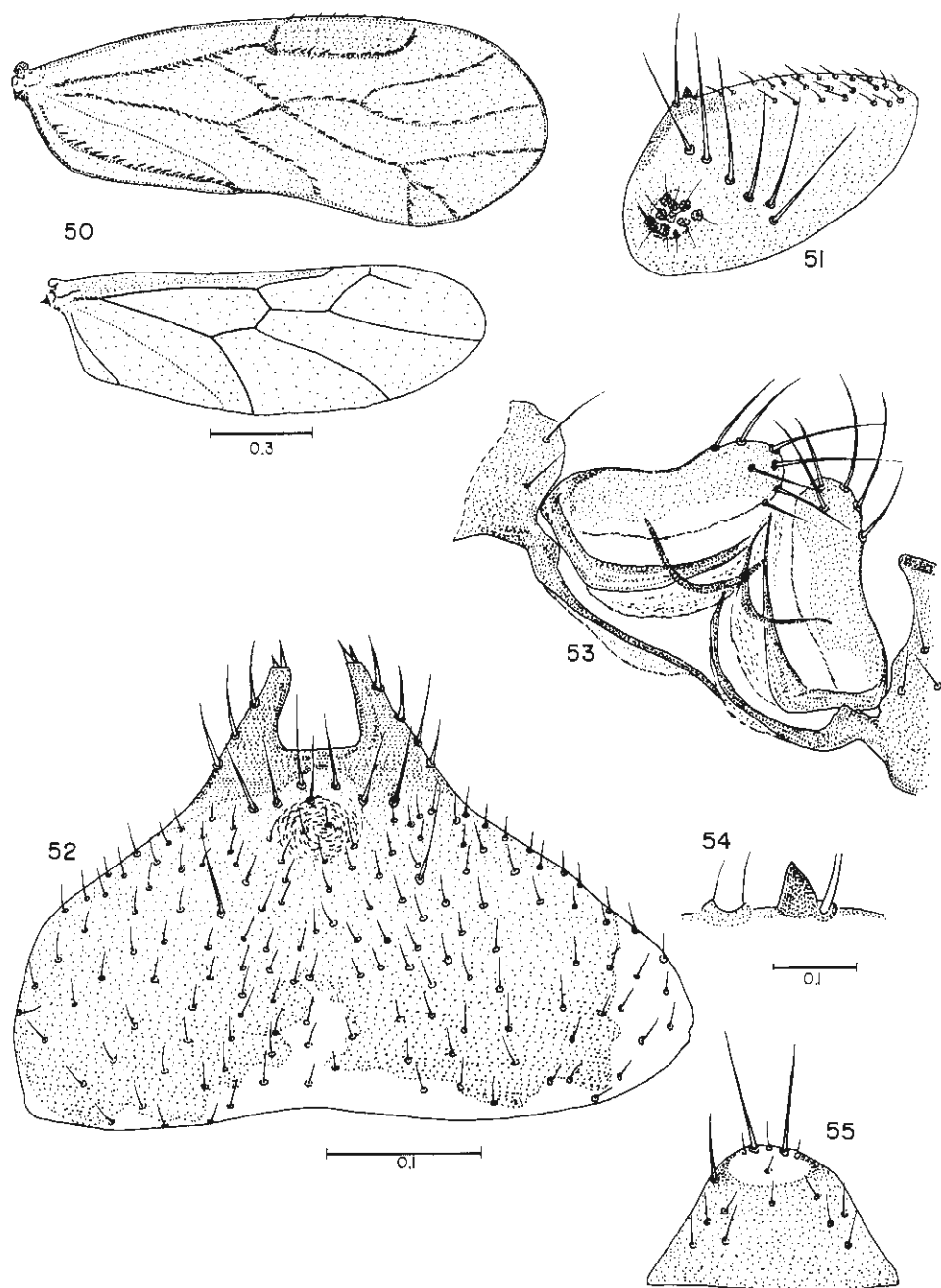
E. vachoni Badonnel, 1945, p.44

This is a widely distributed species, originally described from Morocco, and presently known in England, France, Spain, Argentina, Chile, the USA (Georgia, Texas and Florida), and México, where it has been recorded in the states of Chiapas, Guerrero, Hidalgo, México, Nuevo León, Oaxaca, Querétaro, San Luis Potosí, Tamaulipas and Veracruz. The individual records are too numerous to be cited; it belongs in species group *denervus* of Thornton & Wong (1968).

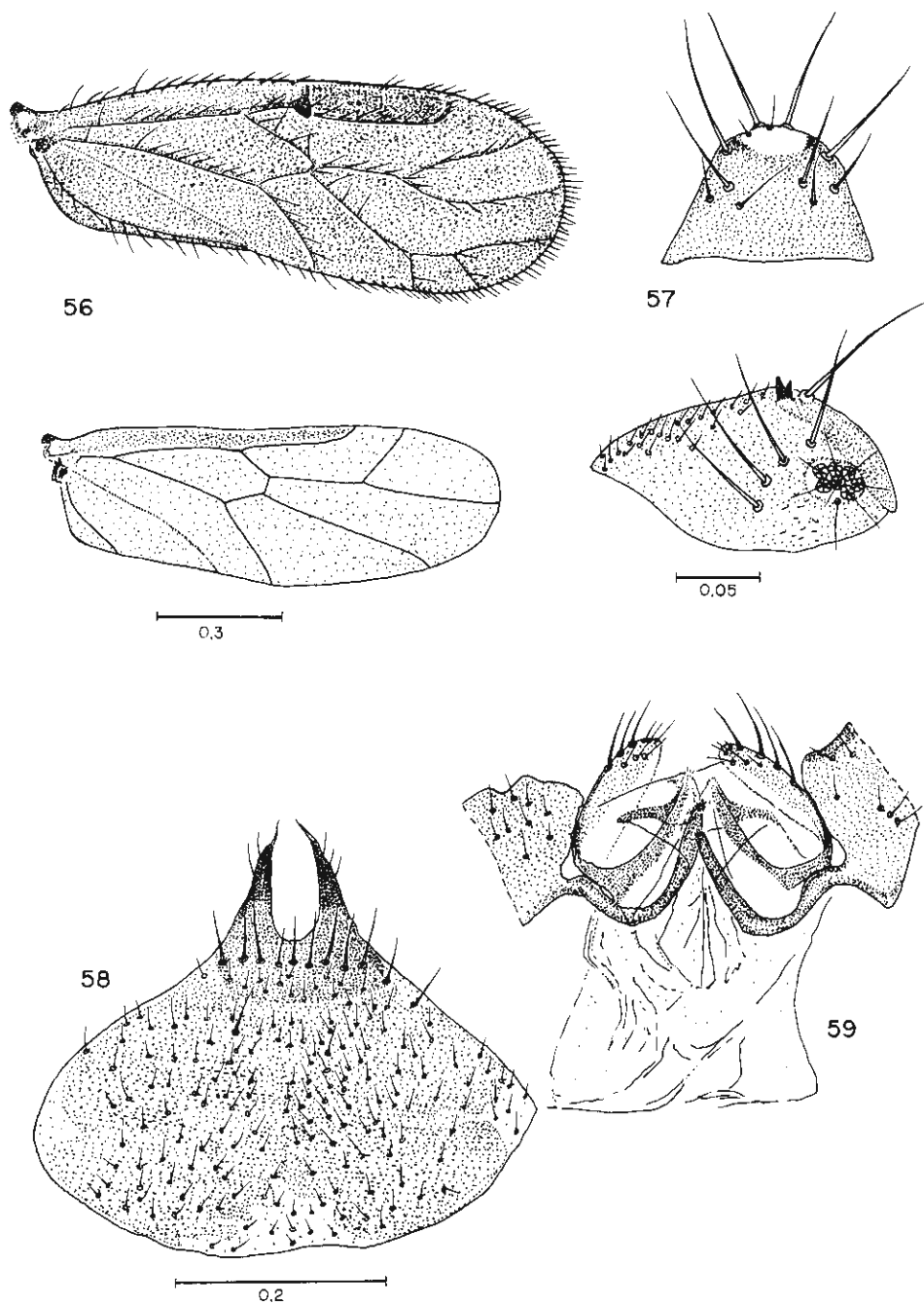
Ectopsocus veracruzensis n. sp.

(Figs. 56-62)

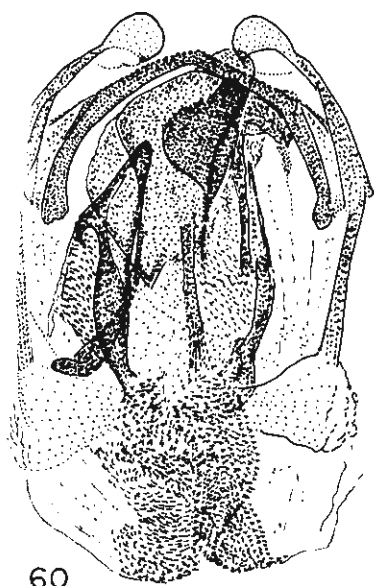
Female. Color (in 80% alcohol). Body reddish tan; compound eyes black, ocelli clear, with dark brown centripetal crescents. Antennae, maxillary palps and legs



Figs. 50-55. *Ectopsocus tuxtlarum* n. sp. ♀. 50. Fore and hind wings; 51. Left paraproct; 52. Subgenital plate; 53. Gonapophyses; 54. Marginal cone of paraproct; 55. Epiproct. Scales in mm. Figs. 51, 53 and 55 to same scale as Fig. 52.

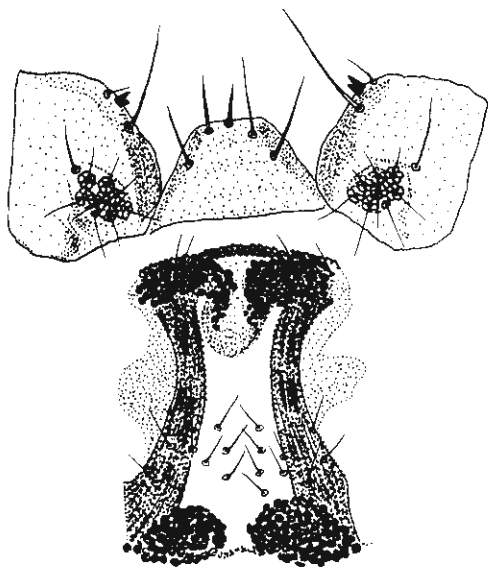


Figs. 56-59. *Ectopsocus veracruzensis* n. sp. ♀. 56. Fore and hind wings; 57. Epiproct and right paraproct; 58. Subgenital plate; 59. Gonapophyses and ninth sternum. Scales in mm. Fig. 59 to same scale as Fig. 58.

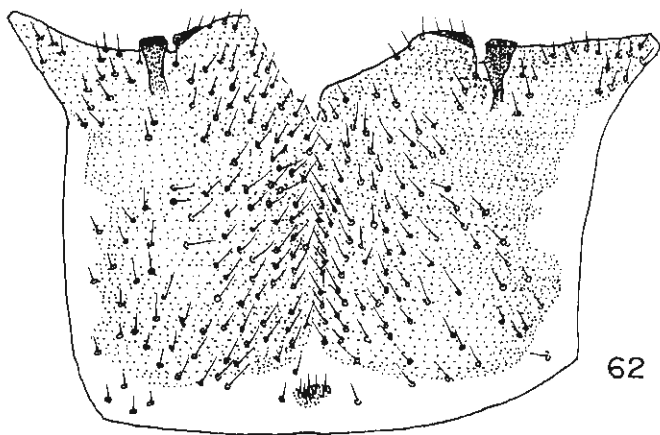


60

0.1



61



62

0.2

Figs. 60-62. *Ectopsocus veracruzensis* n. sp. ♂. 60. Phallosome; 61. Clunium, epiproct and paraprocts; 62. Hypandrium. Scales in mm. Fig. 61 to same scale as Fig. 60.

pale brown. Fore wings reddish brown (Fig. 56), hind wings opaque, less pigmented.

Morphology. Subgenital plate (Fig. 58) with pigmented area irregular and slightly concave anteriorly; with ten macrosetae in the transverse posterior row; posterior end of the plate, including the projections, considerably more pigmented than anteriorly. Posterior projections slender, each with a long, apical macroseta, and two or three on the external margin. Gonapophyses (Fig. 59), with a transverse, almost triangular membranous area associated with each dorsal valve. Paraprocts almost elliptical (Fig. 57), with eight trichobothria (one without basal rosette), on each sensory field; marginal cones bifid, asymmetrical. Epiproct trapezial (Fig. 57), with a non-pigmented area apically; setae and pigmentation of epiproct and paraprocts as in figure 57.

Measurements (in microns) (Table 1)

Male. Color (in 80% alcohol). Same as the female.

Morphology. Hypandrium broad, setose, almost rectangular (Fig. 62), with a small longitudinal, sclerotized bar on the posterior margin, between each postero-lateral corner and the longitudinal midline. Phallosome with external parameres slender (Fig. 60), anteriorly connected by a wide, membranous bridge; apical portion of each paramere dilated, rounded. Internal parameres fused to form a strongly sclerotized arch, with a coarse texture on the external surface. Radular sclerites complex, limited anteriorly by a large, irregular membrane, covered with microspines. Ninth abdominal tergite elongated (Fig. 61), with a comb of short teeth along the posterior margins; lateral margins strongly sclerotized, and a field of strongly sclerotized papillae on each corner of the tergite. Paraprocts almost rounded (Fig. 61), with nine trichobothria (one without basal rosette), on each sensory field; a macroseta next to each sensory field, posteriorly; marginal cones bifid, asymmetrical and each flanked by one macroseta and one small seta. Epiproct trapezial (Fig. 61), with lateral margins sclerotized; setae of epiproct and paraprocts as in figure 61.

Measurements (in microns). Table 1

Type locality. MEXICO; VERACRUZ: Los Tuxtlas, 4 km NE of Catemaco, 16.VIII.1973, beating branches in forest patch, HOLOTYPE ♂, ALLOTYPE ♀ one PARATYPE ♂ and three PARATYPES ♀.

Records. MEXICO; VERACRUZ: Río Nautla, ca. Nautla, 25.V.1982, Berlese, mangrove litter, LC, 1 ♀.

Comments. This species is reminiscent both of *E. himalayanus* New (1971), and *E. columbianus* Badonnel (1986), from which it can be distinguished on genital details of both sexes. It is assignable to species group *fenestratus*, of Thornton & Wong (1968), particularly on phallosome and male ninth tergite characters; it is close to *E. pacificus*, from which it can be distinguished by the ninth abdominal tergite of the males (compare Figs. 45 and 61, notice the presence of distinct, sclerotized, lateral borders in *E. veracruzensis*), and by differences in the phallosomes of both species (compare Figs. 43 and 60, notice that the posterior keel-like sclerite is slender, and the apices of the external parameres are more rounded in *E. veracruzensis*).

Ectopsocus vilhenai Badonnel*E. vilhenai* Badonnel, 1955, p. 189

This species was originally described from Angola; it is presently known from Nigeria, Madagascar, Reunion, Senegal, México, Venezuela, Trinidad, Cuba, Puerto Rico and Marie Galante (Mockford, 1974; Badonnel, 1981). I have additional records from Honduras and Nicaragua. The Mexican records are the following: CHIAPAS: 10km NE of Cintalapa, 400m., 9.VIII.1975, beating shrubs with dead leaves, 1 ♀. VERACRUZ: 28 km SE of Paso del Toro, 29.VI.1979, beating dead-hanging fronds of *Sabal mexicana*, DY, 7 ♀, 1 ♂. JALISCO: Chamela, Manglar de las Salinas, 8.IX.1987, sifting mangrove litter, 12 ♀, 14 ♂. UNAM Tropical Biology Station, 8.IX.1987, beating branches in forest, IWB 1 ♂.

E. vilhenai belongs in species group *cinctus* of Thornton & Wong (1968).

Ectopsocus yucatanus n. sp.

(Figs. 63-69)

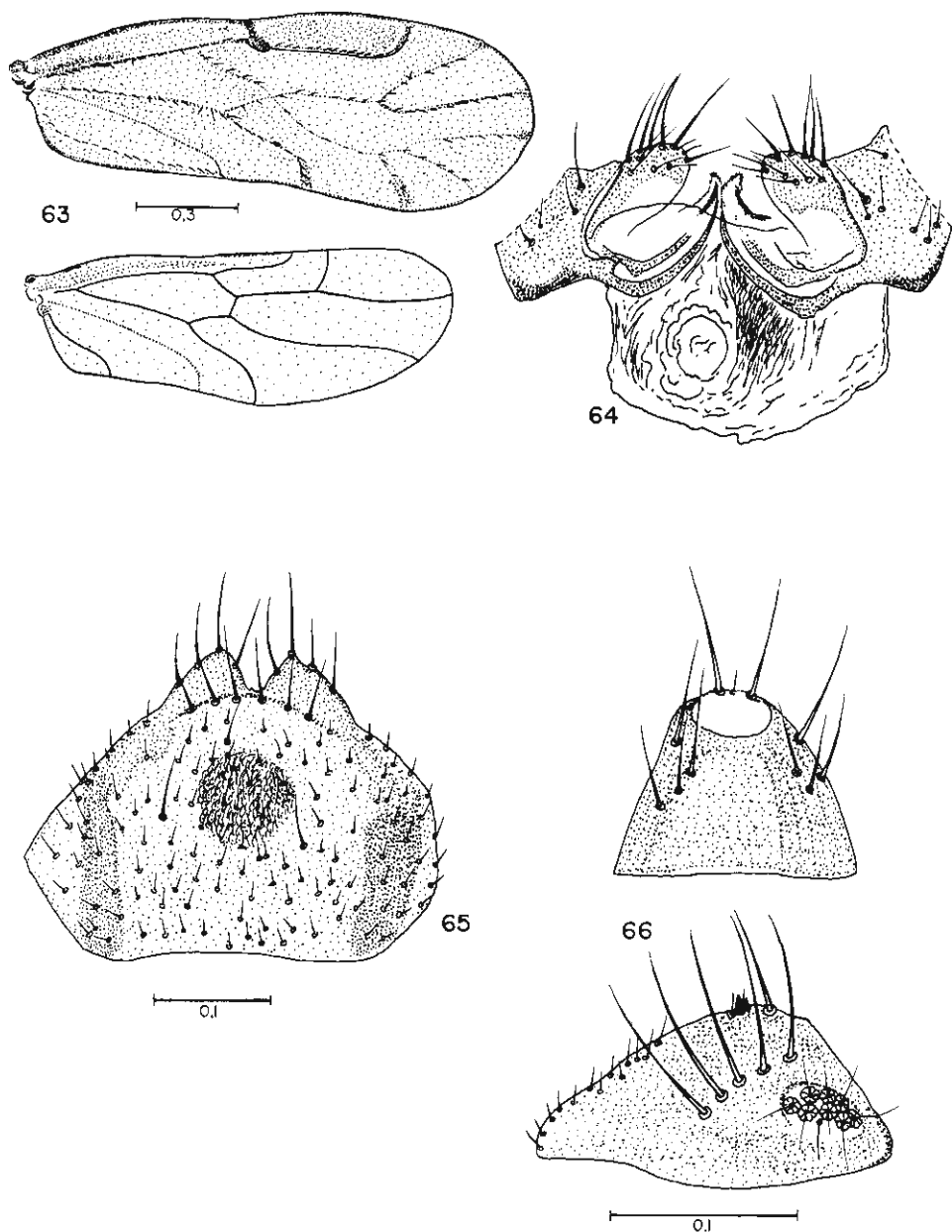
Female. Color (in 80% alcohol). Body pale tan; compound eyes black, ocelli clear, with reddish brown centripetal crescents. Antennae, maxillary palps and legs brown. Fore wings slightly opaque (Fig. 63), with a brown hue; apices of R2+3, R4+5, M1, M2, M3 and Cu1 with slightly pigmented spots.

Morphology. Subgenital plate with a rounded mesal area (Fig. 65), textured differently from the rest of the plate; a longitudinal, pigmented band close to each lateral margin and six macrosetae in the transverse posterior row. Posterior projections short, stout, conical, with an obtuse concavity between them; each projection with four macrosetae along the margin (Fig. 65). Gonapophyses with short and stout external valves (Fig. 64). Ninth sternite with straight sides, and anterior margin a little convex. Paraprocts semi-elliptical (Fig. 66), with nine trichobothria (one without basal rosette), on each sensory field; marginal cones bifid and asymmetrical, flanked by one macroseta and one small seta. Epiproct trapezoidal (Fig. 66), with a non-pigmented apical area; setae and pigmentation of epiproct and paraprocts as in figure 66.

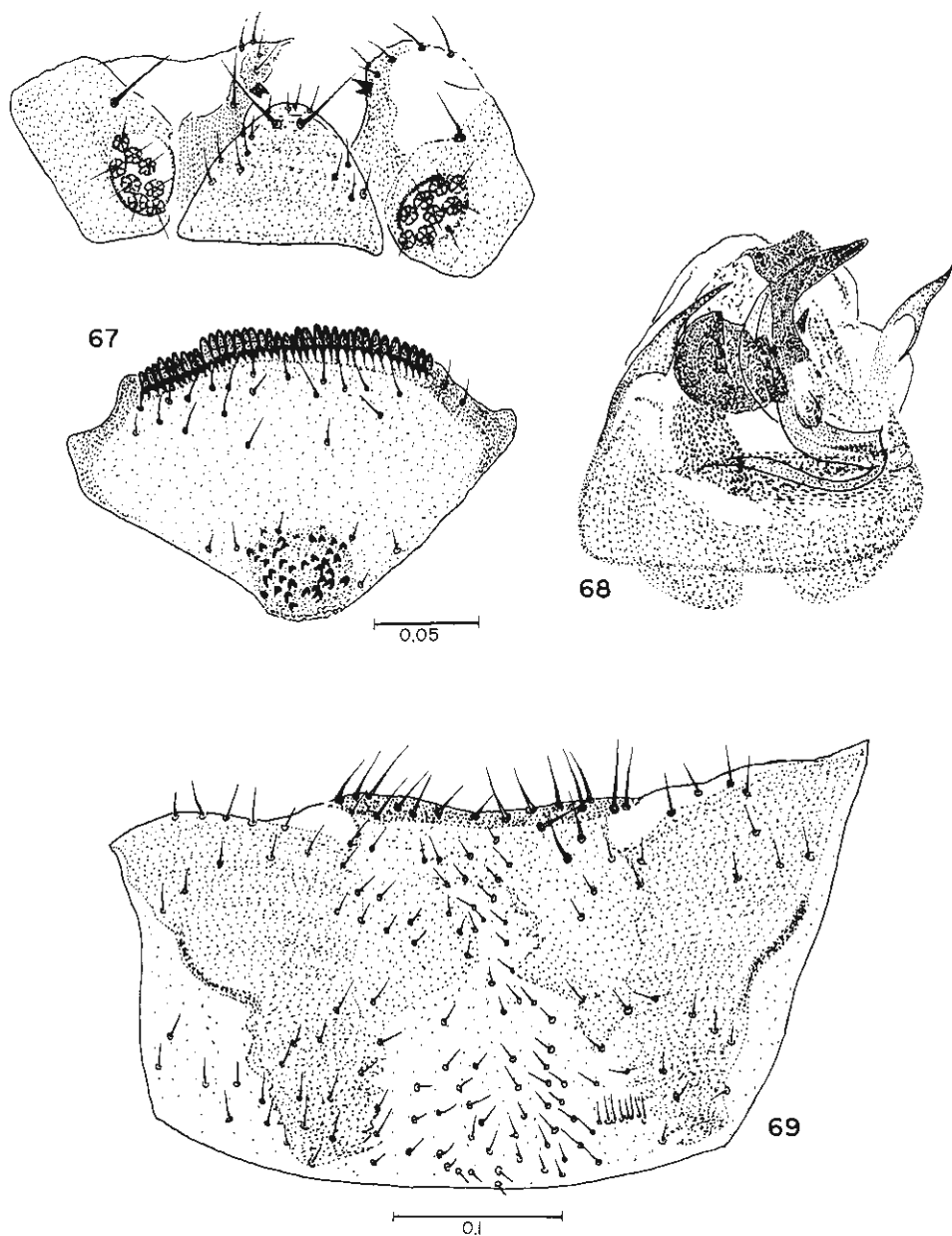
Measurements (in microns) (Table 1)

Male. Color (in 80% alcohol). Same as the female.

Morphology. Hypandrium broad, almost rectangular (Fig. 69), setose, with pigmented area deeply cleft anteriorly; posterior margin strongly sclerotized in the middle, with field of macrosetae. Phallosome with external parameres terminally acuminate (Fig. 68), directed posteriorly, and joined basally by a weakly pigmented bridge. Radular sclerites complex, one curved, with an acuminate, slender projection anteriorly, and distal end strongly sclerotized, blunt, rugose; other sclerite also curved, with distal end acuminate; median sclerite strongly sclerotized, rounded; a papillate membrane at the base of the complex (Fig. 68). Ninth abdominal tergite broadly triangular (Fig. 67), setose, with a thick comb along posterior border, antero-lateral margins sclerotized, and a field of sclerotized papillae on anterior apex. Paraprocts slightly elongated (Fig. 69), with nine trichobothria (one without



Figs. 63-66. *Ectopsocus yucatanus* n. sp. ♀. 63. Fore and hind wings; 64. Gonapophyses and ninth sternum; 65. Subgenital plate; 66. Epiproct and right paraproct. Scales in mm. Fig. 64 to same scale as Fig. 66.



Figs. 67-69. *Ectopsocus yucatanus* n. sp. ♂. 67. Clunium, epiproct and paraprocts; 68. Phallosome; 69. Hypandrium. Scale in mm. Fig. 68 to same scale as Fig. 69.

TABLE 1
MEASUREMENTS (IN MICRONS), NUMBER OF CTENIDIA ON t_1 , AND PO (d/D), IN SOME MEXICAN *ECTOPSOCUS*

| | <i>chiapensis</i> | | <i>chiapensisoides</i> + <i>eertmoedi</i> | | <i>formosus</i> | | <i>mexicanus</i> | | <i>obscurus</i> | | <i>pacificus</i> | | <i>thorntoni</i> | | <i>tuxtlarum</i> | | <i>veracruzensis</i> | | <i>yucatanus</i> | |
|------------------|-------------------|------|---|------|-----------------|------|------------------|------|-----------------|------|------------------|------|------------------|------|------------------|------|----------------------|------|------------------|------|
| | sp. nov. | Q | Q | Q | Q | Q | Q | Q | Q | Q | Q | Q | Q | Q | Q | Q | Q | Q | Q | Q |
| | sp. nov. | Q | Q | Q | Q | Q | Q | Q | Q | Q | Q | Q | Q | Q | Q | Q | Q | Q | Q | Q |
| FW | 1477 | 1419 | 224 | 535 | 1513 | 1528 | 1581 | 1463 | 1369 | 1122 | 1169 | 1135 | 1103 | 1441 | 1584 | 1311 | 1297 | 1561 | 1432 | 1432 |
| HW | 1228 | 1104 | 118 | 434 | 1245 | 1239 | 1256 | 1180 | 1088 | 920 | 961 | 916 | 907 | 1169 | 1285 | 1088 | 1090 | 1264 | 1173 | 1173 |
| F | 349 | 330 | 263 | 302 | 330 | 349 | 344 | 318 | 303 | 306 | 298 | 273 | 246 | 313 | 386 | 313 | 307 | 350 | 328 | 328 |
| T | 567 | 530 | 394 | 487 | 504 | 556 | 567 | 520 | 506 | 443 | 450 | 443 | 424 | 513 | 644 | 489 | 497 | 576 | 546 | 546 |
| t_1 | 190 | 198 | 112 | 178 | 151 | 212 | 206 | 159 | 176 | 166 | 174 | 159 | 161 | 175 | 212 | 175 | 171 | 209 | 216 | 216 |
| t_2 | 87 | 83 | 71 | 87 | 76 | 76 | 76 | 83 | 89 | 78 | 87 | 85 | 73 | 70 | 100 | 78 | 81 | 81 | 76 | 76 |
| ctt ₁ | 13 | 15 | - | 10 | 11 | 13 | 16 | 8 | 6 | 11 | 10 | 10 | 12 | 14 | 11 | 11 | 14 | 14 | 14 | 16 |
| P ₄ | 106 | 94 | 74 | 72 | 87 | 99 | 90 | 88 | 77 | 80 | 77 | 85 | 81 | 84 | 111 | 89 | 86 | 103 | 91 | 91 |
| f ₁ | 212 | 255 | 145 | 224 | 173 | 265 | 314 | 252 | 265 | 147 | 137 | 170 | 172 | 217 | 261 | 197 | 204 | 256 | 275 | 275 |
| f ₂ | 110 | 136 | 71 | 125 | 92 | 126 | 159 | 114 | 154 | 64 | 67 | 74 | 77 | 118 | 130 | 93 | 103 | 146 | 170 | 170 |
| f ₃ | 108 | 135 | 77 | 118 | 85 | 125 | 159 | 96 | 132 | 69 | 72 | 77 | 81 | 78 | 131 | 92 | 100 | 126 | 146 | 146 |
| f ₄ | 88 | 94 | 66 | 100 | 68 | 91 | 129 | 78 | 113 | 63 | 68 | 62 | 68 | 63 | 99 | 72 | 76 | 87 | 98 | 98 |
| f ₅ | 76 | 84 | 58 | 78 | 58 | 81 | 101 | 63 | 90 | 55 | 56 | 57 | 60 | 53 | 81 | 66 | 66 | 64 | 75 | 75 |
| f ₆ | 75 | 83 | 57 | 79 | 54 | 72 | 96 | 58 | 88 | 49 | 56 | 53 | 60 | 62 | 75 | 56 | 63 | 72 | 74 | 74 |
| f ₇ | 70 | 76 | 53 | 71 | 49 | 69 | 88 | 58 | 81 | 46 | 50 | 53 | 53 | 59 | 64 | 59 | 55 | 56 | 66 | 66 |
| f ₈ | 69 | 70 | 53 | 65 | 53 | 65 | 85 | 61 | 82 | 47 | 53 | 53 | 57 | 66 | 70 | 54 | 60 | 57 | 64 | 64 |
| f ₉ | 65 | 73 | 54 | 72 | 48 | 72 | 89 | 63 | 75 | 47 | 53 | 47 | 55 | 71 | 64 | 58 | 59 | 54 | 61 | 61 |
| f ₁₀ | 66 | 67 | 53 | 65 | 50 | 66 | 84 | - | 74 | 41 | 46 | 48 | 53 | 74 | 62 | 54 | 54 | 53 | 57 | 57 |
| f ₁₁ | 82 | 82 | 70 | 90 | 74 | 93 | 116 | - | 116 | 53 | 65 | 62 | 74 | 87 | 87 | 64 | 70 | 65 | 69 | 69 |
| IO | 356 | 318 | 345 | 303 | 339 | 361 | 249 | 300 | 253 | 338 | 308 | 302 | 212 | 301 | 353 | 327 | 323 | 327 | 241 | 241 |
| D | 136 | 150 | 98 | 122 | 136 | 142 | 241 | 126 | 114 | 128 | 134 | 109 | 95 | 136 | 153 | 131 | 141 | 152 | 202 | 202 |
| d | 74 | 82 | 53 | 69 | 72 | 82 | 162 | 69 | 69 | 66 | 84 | 60 | 59 | 79 | 92 | 77 | 76 | 121 | 126 | 126 |
| PO | 0.54 | 0.54 | 0.54 | 0.56 | 0.52 | 0.57 | 0.67 | 0.54 | 0.60 | 0.51 | 0.62 | 0.55 | 0.62 | 0.58 | 0.60 | 0.58 | 0.53 | 0.79 | 0.62 | 0.62 |

basal rosette), on each sensory field, and one macroseta next to each field; marginal cones bifid, asymmetrical. Epiproct almost triangular (Fig. 67); setae and pigmentation of epiproct and paraprocts as in figure 67.

Measurements (in microns) (Table 1)

Type locality. MEXICO; YUCATÁN: 8 km E of Progreso, towards Telchac, 14.VII.1986, beating dead fronds of fan palm, HOLOTYPE ♂, ALLOTYPE ♀, 23 ♀ and 27 ♂ PARATYPES.

Comments. This species is assignable to species group *ornatus* of Thornton & Wong (1968), although it does not have hyaline fore wings and apical hypandrial lobes. It is close to *E. spilotus* Thornton & Wong, in genital characters of males and females, but unlike *E. spilotus*, it does not have patterned fore wings.

DISCUSSION

The presently known fauna of Mexican *Ectopsocus* consists of 19 species, seven of which are either cosmopolitan or pantropical in distribution. These are: *E. briggsi*, *E. maindroni*, *E. meridionalis*, *E. richardsi*, *E. titschacki*, *E. vachoni*, and *E. vilhenai*; one species is also known from the Caribbean area (*E. thibaudi*), and the remaining 11 species have not been recorded outside of México, for a level of endemism of 57%. The richness of Mexican *Ectopsocus* species is high and, as compared with the *Ectopsocus* fauna of whole zoogeographic regions it is only surpassed by the Oriental and the Australian regions. México has the same number of *Ectopsocus* species as the African Continent, and more species than Australia; in relation to the Neotropical region, the Mexican species of *Ectopsocus* represent 73% of the whole fauna (Table 3).

Table 2 presents a list of the 130 species presently recognized in *Ectopsocus*, and their geographical distribution, including the species formerly assigned to *Interpsocus*; it was compiled from Smithers' Catalogue of the Psocoptera of the World (1967), from more recent sources, cited in the references, and from the species treated in this paper. The Oriental region is understood as tropical Asia, with the associated continental islands of Sri Lanka (Ceylon), Sumatra, Java, Borneo, Philippines, Taiwan, and some adjacent smaller islands (New, 1977). The Australian region includes mainland Australia, Tasmania, New Zealand, Chatham, and Melanesia (New Caledonia, Norfolk and Lord Howe islands); the division of Oceania, as an extension of the Oriental region follows Gressitt (1961). The Neotropical region includes, besides southern México, Central and South America, the Galapagos Archipelago, the Greater and Lesser Antilles, and other smaller islands off the continent.

Table 3 shows the number of species of *Ectopsocus*, and the levels of endemism, expressed as a percentage over the total number of species for each zoogeographic region. Finally, Table 4 presents a matrix of the number of *Ectopsocus* species shared between pairs of regions and Simpson's indices of faunistic similarity for pairs of regions. Simpson's index was chosen for comparison by its robustness and convenience, following Sánchez and López (1988).

The low number of species of *Ectopsocus* in both the Nearctic and the Palearc-

TABLE 2

SPECIES OF *ECTOPSOCUS* AND GEOGRAPHICAL DISTRIBUTION

| Species | Distribution |
|--|---|
| <i>E. adelphus</i> Thornton & Wong, 1968: 81 | New Guinea (PAP) |
| <i>E. aethiops</i> (Hagen), 1859: 204 | Ceylon, Philippines (O). |
| <i>E. albiceps</i> Smithers, 1977: 272 | Australia (A) |
| <i>E. amblyura</i> Thornton & Wong, 1968: 63 | Palawan (O) |
| <i>E. amphithrix</i> Thornton & Wong, 1968: 47 | Malaya (O) |
| <i>E. annandalei</i> Datta, 1969: 295 | India (O) |
| <i>E. argus</i> Thornton & Wong, 1968: 64 | Palawan (O) |
| <i>E. axillaris</i> (Smithers), 1969: 293 | New Zealand (A) |
| <i>E. baliosus</i> Thornton & Wong, 1968: 47 | Malaya, Bali, Lombok, Reunion, Australia (O, A) |
| <i>E. basalis</i> Banks, 1937: 133 | Malaya, Philippines (O) |
| <i>E. bengalensis</i> Datta, 1965: 58 | India (O) |
| <i>E. berleseii</i> Ribaga, 1900: 364 | Italy, Portuguese Guinea (P,AE) |
| <i>E. bicaudatus</i> Badonnel, 1935: 118 | Madagascar (AE) |
| <i>E. boharti</i> Thornton & Wong, 1968: 94 | Bonins Is. (M) |
| <i>E. borealis</i> Harrison, 1916: 134 | England (P) |
| <i>E. briggsi</i> McLachlan, 1899: 277 | Australia, Azores, Argentina, Bali, Belgium, Chile, Central America, England, France, Marianas Is., Mexico, New Zealand, Reunion., South Africa, U.S.A. (P.A.O. NEO, N. EA, AE. Cosmopolitan) |
| <i>E. brunneus</i> (Edwards), 1950: 126 | Tasmania (A) |
| <i>E. brunneus</i> Vishnyakova, 1963: 92 | Armenia (P) |
| <i>E. californicus</i> (Banks), 1903: 237 | California, U.S.A., Australia, Antipodes Is., New Zealand, Tasmania (NEA, A) |
| <i>E. cetratus</i> Smithers, 1972: 15 | Australia (A) |
| <i>E. cinctus</i> Thornton, 1962: 305 | W. Australia, Hong Kong, India, Malaya, Lombok, Vietnam (A, O) |
| <i>E. cirratus</i> Thornton & Wong, 1968: 50 | Malaya (O) |
| <i>E. coccophilus</i> Ball, 1943: 22 | Congo (AE) |
| <i>E. columbianus</i> Badonnel, 1986: 206 | Colombia (NEO) |
| <i>E. comitus</i> Thornton & Wong, 1968: 30 | Hong Kong (O) |
| <i>E. comptus</i> Thornton & Wong, 1968: 120 | Samoa (C. POL.) |
| <i>E. crinitus</i> Thornton & Wong, 1968: 50 | Malaya (O) |
| <i>E. cristatus</i> Thornton & Wong, 1968: 81 | New Guinea (PAP) |
| <i>E. chiapensis</i> García Aldrete | México (NEO) |
| <i>E. chiapensoides</i> García Aldrete | México (NEO) |
| <i>E. decoratus</i> Thornton & Wong, 1968: 18 | Nepal, Bali (O) |
| <i>E. denervus</i> Thornton & Wong, 1968: 95 | Luzon, Moorea, Samoa, Hawaii, Micronesia, Fiji, Tonga, (O, M, E. MEL., C. POL., SE. POL., HAW.) |
| <i>E. denotatus</i> Thornton & Wong, 1968: 95 | Vietnam (O) |
| <i>E. denudatus</i> Enderlein, 1903: 295 | India (O) |
| <i>E. dialeptus</i> Thornton & Wong, 1968: 125 | Kermadec Is. (C. POL.) |
| <i>E. dicroglossus</i> Thornton & Wong, 1968: 85 | New Guinea (PAP) |
| <i>E. downesi</i> Smithers | Australia (A) |
| <i>E. drepanus</i> Thornton, 1984: 117 | Bali (O) |
| <i>E. edwardsi</i> New, 1973: 347 | Australia (A) |
| <i>E. eertmoedi</i> García Aldrete | México (NEO) |
| <i>E. erosus</i> (Enderlein), 1903: 297 | New Guinea (PAP) |
| <i>E. fenestratus</i> Thornton & Wong, 1968: 98 | Marianas Is. (M) |

NEA: Neartic; NEO: Neotropical; P: Palearctic; AE: Aethiopian; O: Oriental; A: Australian; M: Micronesia; PAP: Papuan; C. POL: Central Polynesia; SE. POL: Southeastern Polynesia; E. MEL: Eastern Melanesia; HAW: Hawaiian Is. Division of the Pacific regions according to Gressitt (1961).

Table 2 continues

| Species | Distribution |
|--|---|
| <i>E. ferrugineiceps</i> Enderlein, 1908: 251 | Comoro and Seychelles Is. (AE) |
| <i>E. flaviceps</i> (Okamoto), 1910: 190 | Japan (P) |
| <i>E. formosus</i> García Aldrete | México (NEO) |
| <i>E. froggatti</i> Enderlein, 1906: 407 | Australia (A) |
| <i>E. fullawayi</i> Enderlein, 1913: 356 | Easter Is., Fiji, Hawaii, Henderson, Mangareva, Marquesas, Moorea, Oeno, Pitcairn, Rapa, Samoa, Ivamotu, Tubuai, Tonga and Wake Islands (HAW., M., C. POL., SE. POL., E. MEL.) |
| <i>E. fumidus</i> Thornton & Wong, 1968: 68 | Luzon (O) |
| <i>E. furcatus</i> Thornton & Wong, 1968: 115 | Malaya, Fiji (O, E. MEL) |
| <i>E. gracilis</i> Thornton & Wong, 1968: 135 | New Zealand (A) |
| <i>E. gradatus</i> Thornton & Wong, 1968: 122 | Samoa (C. POL.) |
| <i>E. halcrowi</i> Pearman, 1960: 248 | E. Africa (AE) |
| <i>E. hawaiiensis</i> Enderlein, 1913: 356 | Hawaii, Guam, Samoa (HAW., M., C. POL.) |
| <i>E. heurni</i> Navás, 1924: 140 | Java (O) |
| <i>E. himalayanus</i> New, 1971: 202 | Nepal (O) |
| <i>E. hirsutus</i> Thornton, 1962: 303 | Aldabras, Chagos Archipelago, Hong Kong, Bali (O) |
| <i>E. hypandrus</i> Thornton, 1984: 118 | Bali, Lombok (O) |
| <i>E. ignotus</i> Thornton & Wong, 1968: 123 | Samoa (C. POL.) |
| <i>E. inornatus</i> Smithers & Thornton, 1974: 224 | Norfolk Is. (A) |
| <i>E. innotatus</i> Thornton & Wong, 1968: 54 | Malaya (O) |
| <i>E. insularis</i> Smithers & Thornton, 1974: 221 | Norfolk Is. (A) |
| <i>E. intersitus</i> Thornton & Wong, 1968: 68 | Luzon (O) |
| <i>E. lambus</i> Thornton, 1981: 118 | Tonga (C. POL.) |
| <i>E. longisetosus</i> Broadhead & Richards, 1980: 373 | Tanzania (AE) |
| <i>E. luridus</i> Badonnel, 1969: 120 | Ongo (AE) |
| <i>E. maculatus</i> Smithers, 1964: 249 | Madagascar (AE) |
| <i>E. maculosus</i> Turner & Cheke, 1983: 389 | W. Africa (AE) |
| <i>E. machadori</i> Badonnel, 1955: 187 | Angola (AE) |
| <i>E. maindroni</i> Badonnel, 1935: 76 | Angola, Arabia, Bali, British Guiana, Carolines Is., Central America, Congo, Cuba, England, Florida, French Guiana, Galapagos Is., Hawaii, Gilbert Is., Hong Kong, Ivory Coast, India, Jamaica, Japan, Lesser Antilles, Madagascar, Malaya, Mauritius, Marianas, Marshall Is., México, Puerto Rico, Taiwan, Texas, Venezuela (P, O, NEA, NEO, AE, M, Cosmopolitan). |
| <i>E. marginatus</i> Thornton & Wong, 1986: 100 | Marianas Is. (M) |
| <i>E. meridionalis</i> Ribaga, 1904: 296 | Angola, Cameroons, Chile, Colombia, Congo, Europe, Galapagos Is., Hawaii, Hong Kong, Jamaica, Japan, Madagascar, Mexico, Morocco, Mozambique, U.S.A., S. Africa, Taiwan, Tanganyika (P, AE, NEA, NEO, O, HAW, Cosmopolitan) |
| <i>E. mexicanus</i> García Aldrete | México (NEO) |
| <i>E. mirus</i> Badonnel, 1967: 160 | Madagascar (AE) |
| <i>E. musae</i> (Kunstler-Chaine), 1903: 1 | France (P) |
| <i>E. myrmecophilus</i> (Enderlein), 1903: 298 | Bismarck, Ceylon, Fiji, India (PAP, O, E, MEL) |
| <i>E. nerens</i> (Hickman), 1934: 88 | Tasmania (A) |
| <i>E. nidicolus</i> Thornton & Wong, 1968: 85 | New Guinea (PAP) |

NEA: Nearctic; NEO: Neotropical; P: Palearctic; AE: Aethiopian; O: Oriental; A: Australian; M: Micronesia; PAP: Papuan; C. POL: Central Polynesia; SE. POL: Southeastern Polynesia; E. MEL: Eastern Melanesia; HAW: Hawaiian Is. Division of the Pacific regions according to Gressitt (1961).

Table 2 continues

| Species | Distribution |
|--|---|
| <i>E. obscurus</i> García Aldrete | México (NEO) |
| <i>E. ornatus</i> Thornton, 1962: 308 | Hong Kong, Puerto Rico, Taiwan (O, NEO) |
| <i>E. ornatoides</i> Thornton & Wong, 1968: 103 | Fiji, Hawaii, Micronesia, Samoa (HAW, M, E, MEL, C. POL) |
| <i>E. pacificus</i> García Aldrete | Mexico (NEO) |
| <i>E. paraplesius</i> Thornton & Wong, 1968: 106 | Caroline Is. (M) |
| <i>E. parvatus</i> Smithers, 1977: 267 | Australia (A) |
| <i>E. pauliani</i> Badonnel, 1967: 164 | Madagascar (AE) |
| <i>E. pearmani</i> Ball, 1943: 8 | Congo, Madagascar, Nigeria (AE) |
| <i>E. pectinatus</i> Smithers, 1964: 248 | Madagascar (AE) |
| <i>E. perkinsi</i> Banks, 1931: 438 | Fiji, Hawaii, Moorea, Samoa, Tonga, Tubuai (HAW, E. MEL, C. POL, SE POL) |
| <i>E. perplexus</i> Smithers, 1977: 264 | Australia (A) |
| <i>E. petersi</i> Smithers, 1978: 144 | England, France, Ireland, Luxembourg (P) |
| <i>E. pictus</i> Mockford, 1974: 146 | Cuba (NEO) |
| <i>E. piger</i> (Hagen), 1869: 202 | Ceylon (O) |
| <i>E. pilosus</i> Badonnel, 1967: 162 | Cambodia, India, Madagascar, Reunion (O, AE) |
| <i>E. pilosoides</i> Smithers, 1972: 12 | Australia (A) |
| <i>E. psychodelicus</i> Turner, 1975: 571 | Jamaica (NEO) |
| <i>E. pteridii</i> Smithers, 1977: 265 | Australia (A) |
| <i>E. pumilis</i> (Banks), 1920: 313 | Azores, Congo, E. Africa, Florida, Hong Kong, India, Japan, Long Island, Texas, U.S.A., Marianas Is. (P, NEA, AE, O, M) |
| <i>E. punctatus</i> Thornton & Wong, 1968: 137 | New Zealand (A) |
| <i>E. ramburi</i> Datta, 1965: 56 | India (O) |
| <i>E. ribagai</i> Enderlein, 1906: 83 | Brazil, Puerto Rico (NEO) |
| <i>E. richardsi</i> (Pearman), 1929: 105 | Angola, Australia, Azores, Brazil, Galapagos Is., Hawaii, Hong Kong, Madagascar, México, U.S.A., W. Africa (HAW, P, AE, O, NEA, NEO, A, Cosmopolitan) |
| <i>E. russulus</i> Smithers, 1977: 269 | Australia (A) |
| <i>E. salpinx</i> Thornton & Wong, 1968: 70 | Bali, Luzon, Malaya, Micronesia, Palawan (O, M.) |
| <i>E. separatus</i> Thornton & Wong, 1968: 107 | Caroline Is. (M) |
| <i>E. similis</i> Badonnel, 1955: 191 | Angola (AE) |
| <i>E. speciosus</i> Thornton & Wong, 1968: 87 | Luzon, Micronesia, New Guinea (O, PAP, M) |
| <i>E. spiculatus</i> New, 1973: 348 | Australia (A) |
| <i>E. spilotus</i> Thornton & Wong, 1968: 107 | Bermuda, Fiji, Gilbert Is., Hawaii, Marshall Is., Moorea, Samoa, Tonga (NEA, M, E. MEL, HAW, C. POL, SE. POL.) |
| <i>E. stictus</i> Thornton & Wong, 1968: 73 | Luzon (O) |
| <i>E. strauchi</i> Enderlein, 1906: 315 | Azores, Bermuda, Canarias, Morocco, St. Helene (P, NEA) |
| <i>E. striatellus</i> Navás, 1931: 321 | Argentina (NEO) |
| <i>E. stricticus</i> Navás, 1932: 109 | Argentina (NEO) |
| <i>E. tenellus</i> Thornton & Wong, 1968: 54 | Malaya (O) |
| <i>E. thibaudi</i> Badonnel, 1979: 52 | Cuba, Lesser Antilles, Florida (U.S.A.), México (NEO) |
| <i>E. thorntoni</i> García Aldrete | México (NEO) |
| <i>E. thysanus</i> Thornton & Wong, 1968: 110 | Marianas Is. (M.) |
| <i>E. tinctus</i> Navás, 1924: 140 | Java (O) |

NEA: Nearctic; NEO: Neotropical; P: Palearctic; AE: Aethiopian; O: Oriental; A: Australian; M: Micronesia; PAP: Papuan; C. POL: Central Polynesia; SE. POL: Southeastern Polynesia; E. MEL: Eastern Melanesia; HAW: Hawaiian Is. Division of the Pacific regions according to Gressitt (1961).

Table 2 continues

| Species | Distribution |
|---|--|
| <i>E. titschacki</i> Jentsch, 1929: 120 | Angola, Antilles, Brazil, Congo, Central America, Cuba, Ivory Coast, Mexico, Palawan, Senegal, Venezuela (AE, NEO, O, PANTROPICAL) |
| <i>E. tuxtlarum</i> García Aldrete | México (NEO) |
| <i>E. triangulus</i> Thornton & Wong, 1968: 89 | Malaya, New Guinea (O, PAP) |
| <i>E. uncinatus</i> Thornton & Wong, 1968: 116 | Fiji (E. MEL) |
| <i>E. unipunctatus</i> Smithers | Australia (A) |
| <i>E. vachoni</i> Badonnel, 1945: 44 | Argentina, Brazil, Chile, England, France, Greece, Mexico, Morocco, Spain, U.S.A., Yugoslavia (P, NEA, NEO) |
| <i>E. vannus</i> Thornton & Wong, 1968: 55 | Malaya (O) |
| <i>E. variabilis</i> Badonnel, 1982: 212 | Senegal (AE) |
| <i>E. veracruzensis</i> García Aldrete | México (NEO) |
| <i>E. vilhenai</i> Badonnel, 1955: 189 | Angola, Cuba, Honduras, Lesser Antilles, Madagascar, México, Nigeria, Nicaragua, Puerto Rico, Reunion, Senegal, Venezuela, (AE, NEO, O, PANTROPICAL) |
| <i>E. villosus</i> Thornton & Wong, 1968: 112 | Carolines, Marshall Is. (M) |
| <i>E. waterstradti</i> (Enderlein), 1901: 547 | Bismark Is., Borneo, Guam, Java, New Guinea (PAP, O, M.) |
| <i>E. yucatanus</i> García Aldrete | México, (NEO) |
| <i>E. zimmermani</i> Thornton & Wong, 1968: 124 | Samoa (C. POL.) |

NEA: Nearctic; NEO: Neotropical; P: Palearctic; AE: Aethiopian; O: Oriental; A: Australian; M: Micronesia; PAP: Papuan; C. POL: Central Polynesia; SE. POL: Southeastern Polynesia; E. MEL: Eastern Melanesia; HAW: Hawaiian Is. Division of the Pacific regions according to Gressitt (1961).

TABLE 3

NUMBER OF SPECIES OF *ECTOPSOCUS* AND DEGREE OF ENDEMISM IN THE REGIONS INDICATED

| Region | No. Species | Endemic | % Endemism |
|----------------------|-------------|---------|---------------|
| Neotropical | 26 | 18 | 69 |
| Nearctic | 8 | 0 | 0 |
| Palearctic | 13 | 4 | 30 |
| Aethiopian | 19 | 8 | 42 |
| (Continental Africa) | | | |
| Madagascar | 11 | 5 | 45 |
| Oriental | 45 | 27 | 60 |
| Australian | 24 | 18 | 75 |
| Papuan | 10 | 5 | 50 |
| Micronesia | 17 | 7 | 41 |
| E. Melanesia | 8 | 0 | 0 |
| C. Polynesia | 12 | 6 | 50 |
| SE. Polynesia | 4 | 0 | 0 |
| Hawaii | 8 | 0 | 0 |

TABLE 4

MATRIX OF NUMBER OF SPECIES OF *ECTOPSOCUS* SHARED AND, IN PARENTHESIS, SIMPSON'S INDICES OF FAUNISTIC SIMILARITY, BETWEEN PAIRS OF REGIONS*

| | Neotropical | Nearctic | Palaearctic | Aethiopian (Cont. Africa) | Madagascar | Oriental | Australian | Papuan | Micronesia | E. Melanesia | C. Polynesia | SE. Polynesia | Hawaii |
|------------------------------|-------------|-----------|-------------|------------------------------|------------|-----------|------------|-----------|------------|--------------|--------------|---------------|------------|
| Neotropical | X | 4 (50) | 5 (38) | 6 (31) | 0 (0) | 7 (26) | 2 (8) | 0 (0) | 1 (5) | 0 (0) | 0 (0) | 0 (0) | 2 (25) |
| Nearctic | | X | 6 (75) | 5 (38) | 0 (0) | 5 (62) | 3 (37) | 0 (0) | 3 (37) | 0 (0) | 0 (0) | 0 (0) | 3 (37) |
| Palaearctic | | | X | 6 (46) | 3 (27) | 5 (38) | 2 (15) | 0 (0) | 2 (15) | 0 (0) | 0 (0) | 0 (0) | 2 (25) |
| Aethiopian (Cont. Africa) | | | | X | 5 (45) | 7 (36) | 2 (10) | 0 (0) | 2 (11) | 0 (0) | 0 (0) | 0 (0) | 2 (25) |
| Madagascar | | | | | X | 3 (27) | 1 (9) | 0 (0) | 1 (9) | 0 (0) | 0 (0) | 0 (0) | 2 (25) |
| Oriental | | | | | | X | 3 (12) | 4 (40) | 6 (35) | 3 (37) | 1 (8) | 1 (25) | 3 (37) |
| Australian | | | | | | | X | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
| Papuan | | | | | | | | X | 2 (20) | 1 (10) | 0 (0) | 0 (0) | 0 (0) |
| Micronesia | | | | | | | | | X | 4 (50) | 5 (41) | 3 (75) | 4 (50) |
| E. Melanesia | | | | | | | | | | X | 5 (62) | 4 (100) | 5 (62) |
| C. Polynesia | | | | | | | | | | | X | 4 (100) | 6 (75) |
| SE. Polynesia | | | | | | | | | | | | X | 4 (100) |
| Hawaii | | | | | | | | | | | | | X |

* Simpson's Index: $\frac{\text{Number of shared species}}{\text{Species in smaller fauna}} \times 100$

tic regions is striking. The absence of endemic species in the former and the low level of endemism in the latter, which, together with the relatively high number of species shared between the two and their high index of similarity (75%), provide additional evidence to support their fusion in a Holarctic Kingdom. Also striking are the differences between Continental Africa and Madagascar, considered traditionally as forming the Ethiopian region. The levels of endemism are similar in both, 42% and 45% respectively, and with only five species of *Ectopsocus* shared, the similarity between them is of only 45%; however, four of the five species shared are either pantropical or cosmopolitan, a fact that accentuates the strong insularity of the Madagascan fauna, as pointed out by Badonnel (1967).

The great majority of the species of *Ectopsocus* are found in the Oriental, Australian and Oceanic (Papua, Micronesia, Melanesia, Polynesia and Hawaii) regions, with high levels of endemism in the Australian (75%), Oriental (60%), and Papuan and Central Polynesia (50% each). The indices of similarity show little affinity of the Oriental region with Australia and Oceania, complete distinctness between Australia and Oceania, and high similarity of Micronesia, Melanesia, Polynesia and Hawaii. The Papuan region is related to the Oriental, with 40% of similarity, and shows also affinity with Micronesia and Eastern Melanesia.

After the Oriental, the richest region in *Ectopsocus* species is the Neotropical, with 26 species, and a high level of endemism, 69%, only surpassed by the Australian region, with an endemism of 75%. Thus, there seem to be three main centers of diversification and evolution of *Ectopsocus*: the Oriental-Oceanic, the Australian and the Neotropical regions.

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